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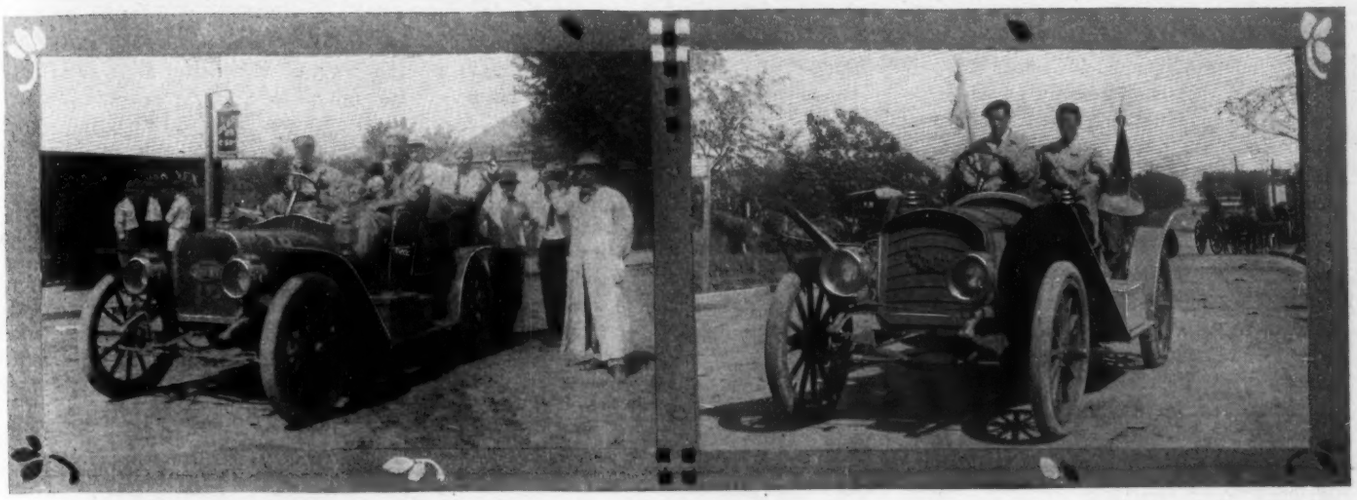
# MOTOR AGE

## CORBIN WINS THE SOUTHWEST RELIABILITY



CORBIN, WINNER OF KANSAS CITY STAR TROPHY

RAMBLER ROADSTER WHICH WAS THE RUNNER-UP

**By P. A. Sutermeister**

KANSAS CITY, MO., Sept. 26—Victory in the southwest reliability tour for the Star trophy perches on the banner of the Corbin, which made the entire 8-day tour with a perfect score. After two critical inspections at the finish, following a protest that the rear axle was sprung, the technical examiners overruled all objections and awarded to Fletcher Cowherd.

A close second was a Rambler roadster, which finished with a score of 994. Eight other cars topped the 900-mark and a few points against the Corbin on final inspection could easily have deprived it of the Kansas City Star cup.

As has been pointed out in Motor Age, the run was not really an 8-day contest, but instead a series of eight 1-day tests. At night the cars, after checking, passed into the hands of their drivers and the garages can tell the tales of repairs, replacements and rebuilding that went on sometimes until within an hour of the time to check out in the morning. This, however, did not count against the car, provided it could pass the night inspection at the time of checking in. As this inspection was not very rigid and did not go under the bonnets or past the grossly noticeable defects of a car, the penalties imposed under it were not very severe. The distance was about 1,000 miles.

On the other hand, every replacement, repair or adjustment, every motor stop; in fact all work on the car from the time it checked out in the morning until it passed inspection at night was subject to penalty. Repairs on tires and filling water, gas and oil tanks alone were excepted. As observers the occupants of each car served, no one special person being delegated to the job.

Tanned by exposure to sun and wind and rain, harder of muscle and more scant of flesh, the tourists reached Kansas City this afternoon, finishing the last day's run, which, by the way, was also the easiest of the tour. All the cars, with the exception of the Pope-Hartford, which blew up five casings soon after leaving the morning control at Iola, Kan., gathered on time on the Southwest boulevard near the point from which they had started 8 days before. There, headed by the pilot, they formed into line and in this fashion proceeded downtown to check in at Eleventh and Grand in the midst of a crowd that afforded little room for the cars. Then there were orders to go to the Paseo and Eleventh for inspection. After that it was the garage and the Ostermoors.

From Paola there were several showers, but the entry into the city was made over the same dusty roads which had afforded a path on the departure.

The story of the tour would not be complete without mention of R. F. McNamara and his Premier six pilot car. The car ran through the entire tour without any mechanical trouble and with only one tire replacement.

**Moon In Hard Luck**

Guthrie, Okla., Sept. 23—It was the Moon of Charles B. Merrill which had the bad luck today. Between Oklahoma City and this place the car got hung up on a hog back. The collar which holds the differential end of the live axle broke and the car was helpless. It was towed into town by James Porter's Chalmers-Detroit 40, which went 10 miles after the Moon after he had checked in. Tonight the committee has not decided whether or not to disqualify the Moon because it was towed into the control.

**SOUTHWESTERN RESULTS**

| | | |
|---|---|---|
| No. 13. | Corbin | 1000 |
| No. 31. | Rambler | 994 |
| No. 39. | Knox | 989 |
| No. 16. | Cadillac | 980 |
| No. 37. | Franklin | 975 |
| No. 2. | Stevens-Duryea | 960 |
| No. 10. | Overland | 952 |
| No. 3. | Peerless | 935 |
| No. 27. | Maxwell | 932 |
| No. 21. | Chalmers-Detroit | 921 |
| No. 35. | Ford | 898 |
| No. 20. | Chalmers-Detroit | 896 |
| No. 15. | Packard | 886 |
| No. 9. | Studebaker | 868 |
| No. 17. | Maxwell | 842 |
| No. 12. | Maxwell | 723 |
| No. 7. | Pope-Hartford | 667 |
| No. 14. | Maxwell | 479 |

WAITING TO CHECK IN AT NEWTON, KAN. SCENE AT ENID, CHECKING STATION IN OKLAHOMA

After leaving the largest city in the state the roads began to get muddy. Spots where culverts should have been, but were not, could not be put down on a map without crowding everything else off. Now and then there was a fairly good stretch, only to be followed by more mud and gumbo. Then there were long stairs of stone, down which the driving was slow and cautious. For every flight down, there was a corresponding one to go up. Deeply-rutted roads, high enough in the center to strike low differentials, began to appear as Guthrie was neared. In a number of places cars which were hung high could see marks left by others that did not have so much clearance.

Merrill and Ettwein were the only contestants to be penalized today for being late. Ettwein was given 49 points penalty because of this. Wurmser's National had 5 points marked against it because of a motor stop. The Brush runabout was assessed 4 because of bent fenders. Five points were deducted on the score of Franklin, No. 37. Two pins in the steering gear of the Franklin showed and the front wheels pursued a course that could hardly be termed straight. Damaged parts is the classification under which the committee imposed the penalty.

PREMIER SIX PILOT CAR

A. C. Wurmser's National had a hard time getting into the control on time. The going was heavy for the big car, which carries five passengers. There was another discussion tonight about the left front wheel of the Chalmers-Detroit No. 20. For 2 nights this car has narrowly escaped penalization for this alleged defect. Tonight the axle was jacked up and the wheels spun.

**More Clear Scores Go**

Arkansas City, Ark., Sept. 24—Two out of the six remaining perfect scores went by the board in today's section of the Southwest motor car reliability tour. The Ford runabout of Charles Norris and the Maxwell of Elliott H. Jones were the two victims. The Ford was late in getting to 101 ranch, the noon control, and the Maxwell had mechanical troubles. Jones sheared the pins from the universal on his drive shaft during the morning, and later got stuck in the mud. There were plenty of other cars, however, that were penalized for the day's run. Among the day's heaviest sufferers was Maxwell, No. 14, when not far from Ceres, Okla., a hamlet of forty persons. This car broke a spring. Another was supplied from the parts carried on the car. It was noticed at the time that the new spring was cracked on two leaves, but it was used anyway. Not more than 300 yards did the car proceed when the second spring went the way of the first, a clear fracture through all leaves right between the spring clips. With a 2 by 4 and a rod of iron, assisted by heavy wire, the car was rigged so that it proceed to 101 ranch, where it was checked in. It made the schedule time from the noon control to Arkansas City, checking in here at 9 o'clock.

Nothing to compare with the road chosen by the committee for this morning has so far been encountered on the tour. Ruts and mudholes, and more of the same, followed in endless succession. The Packard got stuck in the mud and had to winch itself out. A. C. Wurmser's National stalled on the side of a hill and blocked four cars before it could be extricated. A few miles further it did the same thing. The Peerless was tight in a cross-ditch, where the pilot had gone through a farm in order to give a better path. It was by trying to ignore this road and keeping to the main track that Jones encountered the heavy going which disabled him.

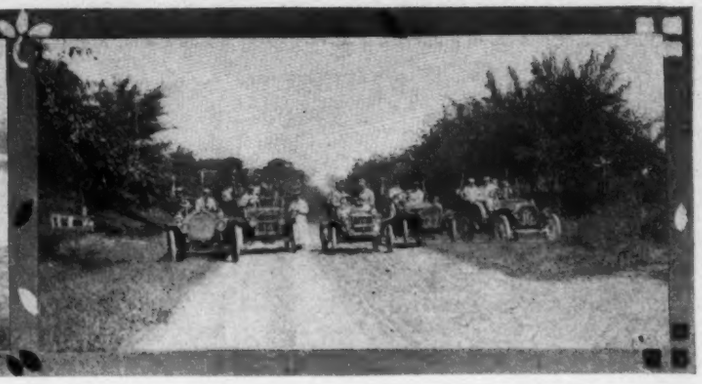
It was nearly midnight when the committee finished its labors and anounced the scores for the day's running. No. 14 was hit hardest, with 293 points in penalties. The score of Elliott Jones is less perfect by 140, and that of Charles Norris' Ford by 61 points. H. F. Worth, who, with Mrs. Worth, is continuing in the run, added 98 to his aggregation of penalties. The reasons for assessing points against the various cars briefly are:

No. 3, Peerless, was pulled out of a mudhole by a team. No. 9, Studebaker, got hung up on a hogback and stalled the

**TABLE SHOWING PENALIZATIONS IN 8-DAY RELIABILITY RUN OF AUTOMOBILE CLUB OF**

| No. | Car | H. P. | Bore | Stroke | Model | Entrant | Driver | Penalty by Days | | | | | | | | Total Penalty | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | | |
| 1 | Premier | 45 | 4½ | 4½ | 45 | Non-Contestant | R. F. McNamara, Pilot | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 2 | Stevens-Duryea | 35 | 5⅝ | 4¾ | U | J. F. Moriarty | J. F. Moriarty | 0 | 0 | 0 | 20 | 0 | 0 | 20 | 9 | 40 | 960 |
| 3 | Peerless | 20 | 4⅞ | 6½ | 18 | D. B. Munger | H. Holzhauer | 0 | 0 | 0 | 4 | 0 | 56 | 5 | 0 | 65 | 935 |
| 4 | White | 30 | ..... | ..... | K | H. E. Rookridge | H. K. Sheridan | 0 | Out | at | end | 1st | da y | | | | |
| 5 | White | 30 | ..... | ..... | K | Winfield Denton | W. R. Leitch | 0 | 0 | 5 | Wi | th | dra | wn | end | 3rd | |
| 6 | National | 50 | 4⅞ | 5 | ..... | A. C. Wurmser | Otto Vegebein | 80 | 0 | 5 | 0 | 5 | 53 | Out | at | noon 6t | h day |
| 7 | Pope-Hartford | 20 | 4⅛ | 5½ | M | Carl Muchlebach | Carl Muchlebach | 0 | 0 | 121 | 0 | 0 | 0 | 54 | 158 | 333 | 667 |
| 9 | Studebaker | 30 | 4⅛ | 5¼ | H | W. L. Walls | W. M. Goodrich | 0 | 0 | 125 | 0 | 0 | 5 | 0 | 2 | 132 | 868 |
| 10 | Overland | 20 | 3½ | 4½ | 24 | H. G. Kirkland | Mrs. H. G. Kirkland | 0 | 25 | 0 | 0 | 0 | 0 | 5 | 18 | 48 | 952 |
| 11 | Premier | 24 | 4¼ | 4¼ | 24 | Frank E. Lott | Frank E. Lott | 374 | Out | end | of | 1st | da y | | | | |
| 12 | Maxwell | 24 | 4¼ | 4¼ | D | Elliott H. Jones | E. H. Jones | 0 | 0 | 0 | 0 | 0 | 140 | 137 | 0 | 277 | 723 |
| 13 | Corbin | 30 | 4½ | 4¾ | K | F. Cowherd, Jr | H. Hargreaves | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1000 |
| 14 | Maxwell | 24 | 4¼ | 4¼ | D | Carl J. Simons | Chas. Levendoske | 0 | 0 | 0 | 20 | 0 | 293 | 208 | 0 | 521 | 479 |
| 15 | Packard | 30 | 5 | 5½ | 30 | E. P. Moriarty | John Chaucer | 15 | 0 | 25 | 0 | 0 | 0 | 60 | 14 | 114 | 886 |
| 16 | Cadillac | 30 | 4 | 4½ | 30 | K. C. Greenlease | R. C. Greanlease | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 20 | 980 |
| 17 | Maxwell | 14 | 4½ | 4½ | LC | W. S. Hathaway | J. A. Holsman | 0 | 0 | 49 | 40 | 0 | 0 | 69 | 10 | 158 | 842 |

MUDDY ROADS FOUND NEAR POND CREEK



ON THE OKLAHOMA-KANSAS LINE ON THIRD DAY

motor for a fraction of a minute. No. 12, Maxwell, was pulled out of a mudhole by a team, in addition to the drive shaft damage noted above. No. 28, Buick, stalled the motor and was pulled out of a mudhole by a team. No. 30, Brush, ran aground with its flywheel and was penalized for an engine stop. No. 35, Ford, was assisted over the high places by the passengers. It was also behind time. No decision was reached tonight as to Moon No. 22 which had to be towed into the control last night.

What came near being the first accident of the tour was avoided today by quick thinking. Wurmser's National was ascending a steep hill just in front of Muehlebach's Pope-Hartford, when the National began to run backward down the hill. This car has been carrying no chains on the wheels, depending entirely on large ropes wound about the tires. The Pope, in danger of being run down, stopped, and was about to begin sliding down the hill to avoid the big National, when the driver of the latter, by a quick twist of the wheel, brought his charge to a stop in a ditch at the roadside. There it resisted all efforts of its engine to pull it out until No. 12, No. 14, No. 15 and No. 16 were close behind, then, with a final effort, it was on its way, not to be headed again until it stalled on a roadside ridge a few miles further on.

**Corbin Only One Perfect**

Iola, Kan., Sept. 25—At the close of today's run only one perfect score, that of Corbin No. 13, remains. The others who were possessors of 1,000-point scores last night are now in the penalized class. Among them are the Rambler, which was penalized on inspection for a missing hub cap and a turned spring shackle; the Maxwell No. 27, which broke a spring and was late at the noon control in Eureka, and the Chalmers-Detroit 30, delayed on the road by tire trouble and otherwise penalized.

Although it was in trouble yesterday, the real strenuous time for A. C. Wurmser's National came this morning. Not far from Winfield other tourists saw the car by the side of the road, the mechanic investigating things under the bonnet. Inspection showed that one of the arms which supports the motor on the frame had broken. Mr. Wurmser shipped the car back to Kansas City.

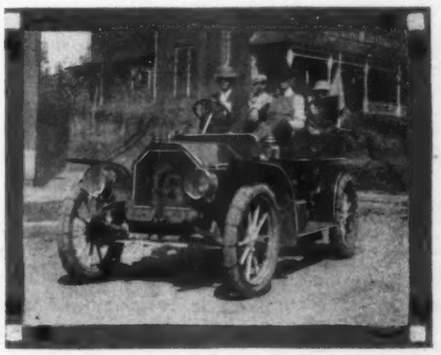
H. F. Worth, who has for some days declared himself dissatisfied with the run, stopped at Yates Center tonight, and did not attempt to reach Iola. He was considerably behind schedule all day, and he did not care to run further than Yates with only lamps to guide. During much of the day Worth's Buick had been hitting mostly on three cylinders, and only intermittently on four.

Penalties assessed today were for the following: Stevens-Duryea, motor stopped; Pope-Hartford, motor stopped; Overland, motor stopped; No. 12 Maxwell, motor stop, adjusting brakes, spring repairs, replacing spark plug; Packard, sprung front axle, motor stop; No. 17 Maxwell, spring repair; No. 27 Maxwell, broken spring; Peerless, damaged fenders; Rambler, missing hub cap, turned spring shackles.

As soon as it was announced that the Corbin had been given a perfect score for the day E. P. Moriarty protested the car on the ground that the rear axle of No. 13 was sprung.

**Brush Makes Complaint**

Detroit, Mich., Sept. 30—Special Telegram—The Brush Runabout Co. today made the following statement: "Driver Huss of Brush runabout in the Kansas City endurance run claims that Brush score should be 777. After finishing the run on schedule and being officially checked in and out he was informed that he had been disqualified because on his arrival at the Eureka control Friday 3 hours late, no checkers could be found. On informing the committee at the Friday night control of this fact he was told to continue on schedule next day but was later pronounced disqualified through the absence of the Eureka checking. The lateness at Eureka was caused by his losing his way after going for help for a disabled car containing a woman and child. The penalties aggregate 223."



CADILLAC, WHICH MADE GOOD SHOWING

## KANSAS CITY, IN WHICH THE CORBIN WAS THE ONLY ONE TO MAKE A PERFECT SCORE

| No. | Car | H. P. | Bore | Stroke | Model | Entrant | Driver | Penalty by Days 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total Penalty | Score |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | Reo | 20 | 4¾ | 6 | Tour'g | H. E. Rooklidge | McDowell | 0 | 25 | 0 | Wi | thd | raw | n | d3d day | |
| 19 | Premier | 30 | 4½ | 4½ | 30 | H. E. Rooklidge | H. L. Hammond | 0 | 0 | 60 | " | " | " | " | " | |
| 20 | Chalmers-Detroit | 30 | 3⅞ | 4½ | 30 | E. P. Moriarity | Jack Stickney | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 50 104 | 896 |
| 21 | Peerless | 30 | 4⅞ | 5½ | 18 | T. C. Brown | T. C. Brown | 109 | 71 | Out | 3d | d ay | | bro | ken cra | nk case arms |
| 22 | Moon | 22 | 4½ | 4½ | C | Charles B. Merrill, | Charles B. Merrill | 0 | 0 | 0 | 0 | 1000 | | con | tin ued | as non-cont. |
| 23 | Chalmers-Detroit | 45-50 | 4¾ | 6 | 40 | rdstr | J. F. Moriarty | 0 | 0 | 72 | 0 | 0 | 5 | 0 | 2 79 | 921 |
| 27 | Maxwell | 14 | 4¼ | 4¼ | K | W. S. Hathaway | Carl J. Simons | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 0 68 | 922 |
| 28 | Buick | 18 | | | 10 | H. F. Worth | H. F. Worth | 19 | 0 | 300 | 0 | 0 | 98 | non | - co ntesta | ant |
| 30 | Brush | 6 | 4 | 4 | B | H. G. Kirkland | Dwight B. Huss | 0 | 0 | 7 | 0 | 4 | 27 | " | " " | " |
| 31 | Rambler | 32 | 4½ | 4½ | 34A | J. E. Anderson | Edward Collier | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 6 | 994 |
| 35 | Ford | 15-18 | | | S | rdstr | Chas. M. Norris | 0 | 0 | 0 | 0 | 0 | 61 | 41 | 0 102 | 898 |
| 26 | Ford | 15-18 | | | S | | S. A. Boyd | 0 | 0 | 112 | Out | 3d | day | bro | ken spring | |
| 37 | Franklin | 42 | 4¼ | 4 | H | | Lewis A. Robertson | 0 | 0 | 0 | 20 | 5 | 0 | 0 | 0 25 | 975 |
| 38 | K. C. Wonder | 16 | 4¼ | 4½ | 1909 | | C. F. Ettwein | 280 | 105 | 5 | 5 | 49 | Out | on | 6th day | |
| 39 | Knox | 30 | 4¾ | 4⅞ | L | Frank L. Woodward | Victor Snyder | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 11 | 989 |

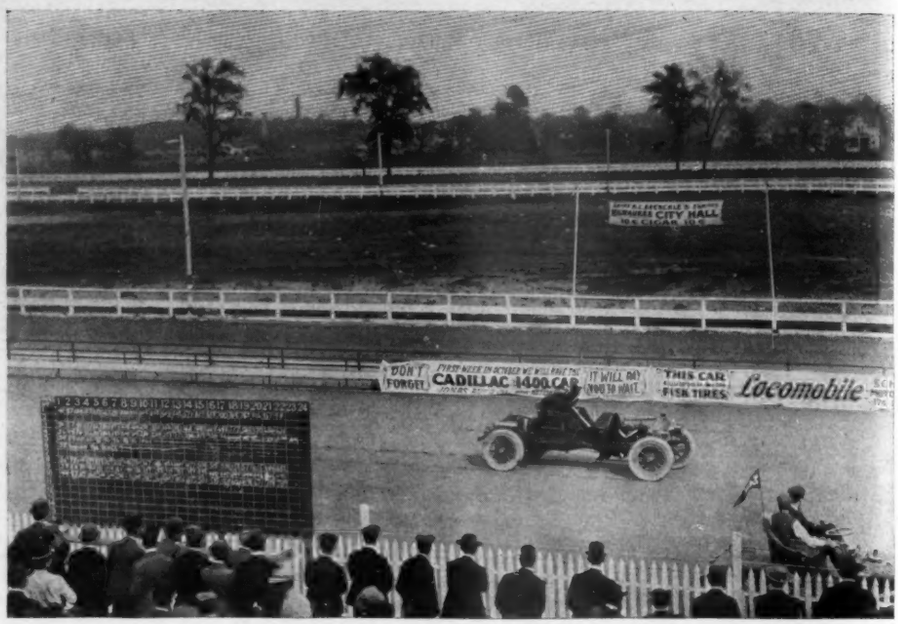
# LOCOMOBILE WINS LONG MILWAUKEE GRIND

MILWAUKEE, Wis., Sept. 28.—A model I Locomobile, driven by Drach and Leiser, won the 24-hour endurance contest, the feature event of the annual 2-day derby of the Milwaukee Automobile Club. The Locomobile reeled off 992¾ miles from 4 o'clock Friday afternoon to 4 o'clock Saturday afternoon. A Mitchell four-cylinder runabout was second, with 808¾ miles. The 1909 White steamer scored 712 miles in this, the first 24-hour endurance contest ever participated in by the White Co. of Cleveland.

Eight cars were sent away at precisely 4 o'clock Friday afternoon by Mayor David S. Rose of Milwaukee. At the finish, five cars were still going. The Maxwell, after a remarkable race with the Locomobile for the first 45 minutes, keeping exactly 1 second ahead of the big car on every lap, struck the fence. Driver Rentner remained in his seat and was unhurt, but the car was disabled for good, a post running through the radiator. The Jackson, after a heart-breaking run for 16 hours, lost the left front wheel and dashed into the fence. Eierman and Bueler escaped unscathed, but the front axle was bent beyond repair and the Jackson was withdrawn. The Petrel broke a piston rod in the sixth hour and retired from the long test.

The race was run over the mile track at the state fair grounds west of Milwaukee. The condition of the course, after a drouth lasting 38 days, was fearful. The contest will thus go down in motor history as the greatest tire-eater the world has known.

The track was hard as flint, but after the first few minor events had been pulled off, it was ground into powder and the tires wore away as if running on steel files. There was no time for oiling and the rest of the race was run under most trying conditions of dust and tire trouble, which perhaps is responsible for no records being broken. It was no uncommon sight to see car after car leave the track after running 10 to 15 miles, for a new tire. Some cars lost 3 to 5 hours in the aggregate replacing tires.




LOCOMOBILE, WINNER OF 24-HOUR RACE, PASSING GRAND STAND

Engine troubles were a minor consideration in the loss of time by cars. The White steamer had trouble with its draught system, the Mitchell was delayed more than an hour, a pin dropping out of the magneto, the Buick was out 4 hours, while a new engine was being installed. The model E Midland was put in without preparation, it was said, being geared three to one. The drivers were instructed to not exceed 35 miles an hour, the company being out to demonstrate the endurance of the car. The pilots followed instructions and held the gait, their average for the time the car was on the track being 32¼ miles an hour, it is asserted. In the last 15 minutes the embargo was lifted and the car showed 45 miles an hour at times.

John Heber, driver of the Buick, a big, bulky German, was the hero of drivers. He drove the race alone, with no assistants or relief. He drove in two short races Friday and in three on Saturday. He is a physical giant and made his race an endurance contest. Summary of the short-distance races Friday and Saturday:

FRIDAY

Five miles, for gasoline stock cars selling at $3,000 or under, for Avery Autogas cup—Pope-Hartford, Harry Nelson, driver, won; time, 5:35; Maxwell, E. F. Sanger, driver, second; Buick, Heber, driver, third; Jackson, Robinson, driver, fourth; Chalmers-Detroit, A. W. Greiner, driver, fifth.

Ten miles, for gasoline stock cars selling at $2,500 and over, for W. L. Hibbard cup—Pope-Hartford, Nelson, won; time, 11:30; Chalmers-Detroit, Greiner, second; Jackson, Robinson, third.

Five miles against time, to break track record of :56¼ made by Oldfield—Sneezer, driven by R. W. Harroun; time, 1:01, 1:02, 1:03, 1:04, 1:04.

SATURDAY

Ten miles, for stock runabouts and touring runabouts, any price, for Augie Jonas cup—Pope-Hartford, Nelson, won; time, 11:04; Buick, Heber, second, 13:04.

Five miles, for gasoline stock cars selling at $5,000 or under, for Louis Esser cup—Pope-Hartford, Nelson, won, in 5:33 3-5.

"Judge Neelen Club" 5-mile dash, open to any car and driver fined for speeding in Milwaukee by Judge Neele B. Neelen, of municipal court—Peerless, Milbrath, won; time, 6:34 1-5; Buick, Heber, second; Pierce-Arrow, Hamilton, third; Locomobile, Emil Schandein, fourth; Rambler, P. C. Avery, fifth; Buick, A. C. Brenckle, sixth.

Compliments of all sorts were handed out to the hard-working officials of the Milwaukee Automobile Club for the manner in which they handled the big race. Apparently nothing had been overlooked and there wasn't a hitch from start to finish. Forty-

STREET CAR REGISTERS SCORED LAPS

## HOURLY SCORES MADE IN 24-HOUR RACE AT MILWAUKEE

| CAR AND DRIVERS | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Locomobile, Drach and Leiser | 41 | 87 | 129 | 167 | 212 | 253 |
| | | 46 | 42 | 38 | 45 | 41 |
| Mitchell, Mader and Betts | 44 | 87 | 117 | 160 | 200 | 200 |
| | | 43 | 30 | 43 | 40 | .. |
| White steamer, Condon and Seyfreid | 35 | 78 | 114 | 139 | 178 | 219 |
| | | 43 | 36 | 25 | 39 | 41 |
| Midland, Miller and Roesler | 30 | 57 | 91 | 117 | 127 | 163 |
| | | 27 | 34 | 26 | 10 | 36 |
| Buick, Heber | 29 | 50 | 70 | 94 | 111 | 129 |
| | | 21 | 20 | 24 | 17 | 18 |
| Jackson, Freilson and Eierman | 26 | 48 | 76 | 112 | 147 | 168 |
| | | 22 | 28 | 36 | 35 | 21 |
| Petrel, Walt and Jones | 24 | 59 | 65 | 65 | 85 | 96 |
| | | 35 | 6 | .. | 20 | 11 |
| Maxwell, Rentner | 38 | out | | | | |

four officials, counting the reliefs, were on duty, with Chairman Dearholt of the racing board and Secretary Drought "on the job" from start to finish. The club scored an innovation by securing twenty members of the state militia for guards, and well did they do their work, no one but officials or contestants being allowed on the track, while at the paddock passes were necessary in order to get past the dead line. The club also had secured the emergency hospital which is on the fair grounds and had it fitted up for possible accidents, doctors beings in attendance at all times. Luckily, however, there was no opportunity to try their skill, as in neither the Maxwell nor Jackson accidents was any one hurt. The clerk of the course had a car on the track at all times, and this was utilized once or twice as a tow to pull disabled cars off the course. The clerk made occasional trips around the circuit, picking up loose objects, and in his collection were several horseshoes and long nails. It was noteworthy, though, that despite the many nails on the track there were very few punctures.

The arrangements for checking the progress of the race worked perfectly, the mileage being recorded by means of street car registers, the same as was done last year. Each car had a register and as it finished a lap an attendant pulled a string, which rang a bell and recorded the mile. After the club had secured the registers it had an opportunity to get a set of Burroughs adding machines, the same that was used at Brighton Beach, but it then was too late to make the change. However, the Burroughs people demonstrated the efficiency of their device by recording the work of the Buick. They improved on the New York system by also recording the time for each mile as it was made, having at the end a complete record of the Buick.

The track and grounds were lighted by Avery gas tanks, there being 150 of them in service. On the tracks these were placed at about 35-foot intervals, with a common wash basin acting as a reflector. They were so that the drivers were not blinded by the glare of the lights.

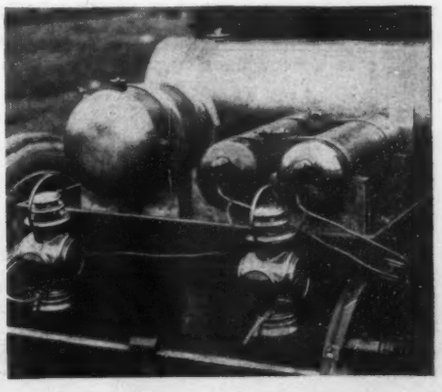
Every car in the race was allowed to put on extra gas and oil tanks, which technically violated the racing rules as regards stock cars. The Locomobile had its extra tanks on the rear, all of them big brass affairs which made the car resemble a chemical fire engine. The gas tank held 22 gallons, while there was a 6-gallon oil tank, not to forget two acetylene gas tanks, making a formidable battery. Like all the others, two tail lights, fed by acetylene gas, were used. The White steamer just doubled its water and fuel capacity, the first by means of a 6-foot affair which was placed on the running board and looked like an extra-long tool box. In addition there was a gasoline tank on the rear of the chassis, which gave the White a capacity of 40 gallons of water and the same in gasoline. It was the extra equipment that proved the undoing of the steamer. This was the first 24-hour race in which it ever had taken part and its entrants were not prepared for it. F. W. Gregory of San Francisco entered the car and it only got here the day before the long grind and there was no chance to try it out. When it did get into the actual contest it was discovered that the two extra tanks seriously interfered with the draught system, necessitating frequent stops because of overheating of the burner.

The Mitchell carried a 35-gallon gasoline tank, while the Buick had an extra 5-gallon tank. The Maxwell had 15 gallons "up its sleeve." The Midland carried an extra 10 gallons as well as 5 gallons of oil. The Jackson packed 8 extra gallons of gas and 3 gallons of oil.

The Locomobile's only reported trouble, outside of tires, was water leaks, caused by the use of a too heavy hose, which caused drips at the connections. The Buick had engine trouble, which bothered the little runabout considerably, finally forcing it to retire for several hours Saturday morning.

Fisk demountables were fitted to the Locomobile, Mitchell and White, while the Midland and Buick had Firestones. Goodyears were on the Jackson and Ajax on the Maxwell. The demountables proved great time savers, fast work being done in changing. As an instance of the speed possible a right front on the Loco was changed in 1 minute 2 seconds. But the tires stood the brunt of the fight, for which the track itself is blamed. In preparing the course the scraper took off the top dressing and filler, leaving a surface like a rough macadam road, the turns being particularly bad because of the flint stones that projected above the surface like the teeth of a saw. Combined with the side-slip of the tires on the turns, the tires did not last very long under this grueling punishment. It was noticeable that the front right always was the first to go, followed by its mate; then the right rear and lastly the left rear. The White did not suffer as much as the Locomobile from tire troubles.

MAKING CHANGE OF FISK DEMOUNTABLE IN THE PADDOCK



EXTRA TANKS ON THE LOCOMOBILE

**WON BY THE LOCOMOBILE, DRIVEN BY DRACH AND LEISER**

| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 291 | 333 | 371 | 408 | 458 | 503 | 542 | 571 | 613 | 658 | 700 | 748 | 783 | 826 | 867 | 911 | 952 | 992¾ |
| 38 | 42 | 38 | 37 | 50 | 45 | 39 | 29 | 42 | 45 | 42 | 48 | 35 | 43 | 41 | 41 | 41 | 40¾ |
| 234 | 272 | 308 | 343 | 364 | 405 | 436 | 472 | 501 | 535 | 569 | 604 | 638 | 671 | 708 | 739 | 774 | 808¾ |
| 34 | 38 | 36 | 35 | 25 | 41 | 31 | 36 | 29 | 34 | 34 | 35 | 34 | 33 | 27 | 31 | 35 | 34¾ |
| 255 | 296 | 330 | 367 | 406 | 426 | 449 | 477 | 504 | 515 | 538 | 558 | 577 | 615 | 646 | 652 | 680 | 712 |
| 36 | 41 | 34 | 37 | 39 | 20 | 23 | 28 | 27 | 11 | 23 | 20 | 19 | 38 | 31 | 6 | 28 | 32 |
| 197 | 229 | 264 | 295 | 330 | 350 | 381 | 411 | 443 | 469 | 491 | 517 | 543 | 570 | 604 | 631 | 662 | 693½ |
| 34 | 32 | 35 | 31 | 35 | 20 | 31 | 30 | 32 | 26 | 22 | 26 | 27 | 27 | 34 | 27 | 31 | 31½ |
| 161 | 194 | 226 | 257 | 288 | 315 | 355 | 389 | 438 | 440 | 440 | 440 | 444 | 446 | 446 | 446 | 478 | 519¾ |
| 32 | 33 | 32 | 31 | 31 | 27 | 40 | 34 | 49 | 2 | .. | .. | 4 | 2 | .. | .. | 32 | 41¾ |
| 185 | 208 | 208 | 214 | 229 | 253 | 262 | 296 | 318 | 350 | out | | | | | | | |
| 17 | 23 | .. | 6 | 15 | 24 | 9 | 34 | 22 | 32 | | | | | | | | |
| out | | | | | | | | | | | | | | | | | |

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# MANUFACTURERS' SHORTCOMINGS A FINANCIAL SUICIDE

## Four Cardinal Virtues

THE cycle of a motor car from the manufacturer's viewpoint is fourfold: First, the car must be designed; second, comes the manufacture of it; the third step is the selling of it; and fourth, the attention the factory must give it when in the service of the owner. Due attention to all four is essential if the success of the manufacturer is to be complete. The designing of a perfect car is not enough to insure success to the maker. If it is not manufactured well it will not prove satisfactory, in spite of its par excellence design. Granted that it is designed well and manufactured well, the maker's success is not assured—it must be sold well. Frequently the expression is heard, "That was a fine car, but the company never seemed to do anything with it." This is the public verdict of not a few factories, whose sales departments were deplorably weak. But the fourth step must not be overlooked. Given a well-designed car, a well-made car, and a well-sold car, there must also come that factory attention and interest, with reference to the people who have purchased machines. Buyers have been heard to remark, "It is an excellent machine, but you can't get any satisfaction out of the factory after you have bought it"—another popular verdict that is ruinous to a factory's success.

## Competent Engineering Department

IN considering the first requisite, namely, design, it is natural the head engineer, or designer, is the paramount factor. His great requirements are thorough knowledge of engineering laws, regard for public demands, adequate grasp of motor car design in America, and abroad, and thorough knowledge of metals. All of these must enter into his make-up; and to these can be added a fifth, namely, art—that characteristic of Italian designers which has done so much to bring Italian cars to the front, because of the embodiment in them of engineering principles, the best materials, and a harmonious outline and arrangement of the many parts in the car. So much of the success of a car depends upon its lightness, and the use of proper materials, that it is imperative the engineer must be a master of metals. If not, he should be provided with a competent metallurgist. Another requisite of this department is the testing laboratory in its threefold aspect of electrical, chemical and physical.

## Factory Organization Imperative

THE proper designing facilities secured, the manufacturing comes next. The factory is the prerequisite, and on its layout, lighting, heating, organization, largely depends whether the first models are ready by July or December. The head buyer must be alert so that he is certain of early deliveries from the makers of ball or roller bearings, from the forging plants, from the magneto and coil makers, from the radiator houses, and the many other factories on which a motor car manufacturer is dependent. If he is not on his job the new model cannot be out before the December show, and during the fall months the enterprising rival maker has his demonstrators in the hands of all his agents and in all probabilities three-quarters of his output disposed of before the dilatory rival has made his announcement. Motor car reputations have been lost by late deliveries, and in not a few cases late deliveries have been caused by the head factory buyer not having made his selections in time. This does not mean it is the buyer's fault; the engineering department may not have had the specifications ready. It may not have been the engineer's fault; the factory president or board of directors may have been late in coming to a decision as to its products. No matter where the fault has been the result is the same—an opportunity has been lost which may require years to regain.

## Alertness in the Selling Force

THERE are in America cars that have been sold by a most carefully organized sales force, rather than by the merits of the car; and, while such factories have traveled in the van, cars of equally meritorious make have gone a-begging for buyers. It is not enough to design and manufacture a car, it must be sold. There are many cars manufactured in lots of 150 per year that are better machines than those manufactured and sold in lots of 1,000. The fault is not with the car but the selling force. The sales department should be the dictators of a factory. They are closest in touch with the consumer, and are best aware of his demands. This department should be the estimator on "next" year's output as well as the type of car required. If the department is awake to its importance, it will be a constant spur to the engineering and manufacturing departments, insisting on early manufacture and early deliveries. Many buyers have bought cars inferior to those they had originally decided upon because they could get a prompt delivery on the inferior machine, but would have to wait months for the machine of their choice. A casual retrospect of the American factories will bring this to the mind of any reader. A competent selling force must look beyond the present, and while disposing of this year's product in ten states must be watching the "next" year's thermometer and surveying the possible selling field of ten other states. The successful manufacturer is one whose plans for the next 3 or 4 years are already in the embryo, but which are sufficiently elastic to adapt themselves to unforeseen exigencies that may arise.

## The Satisfied Customer

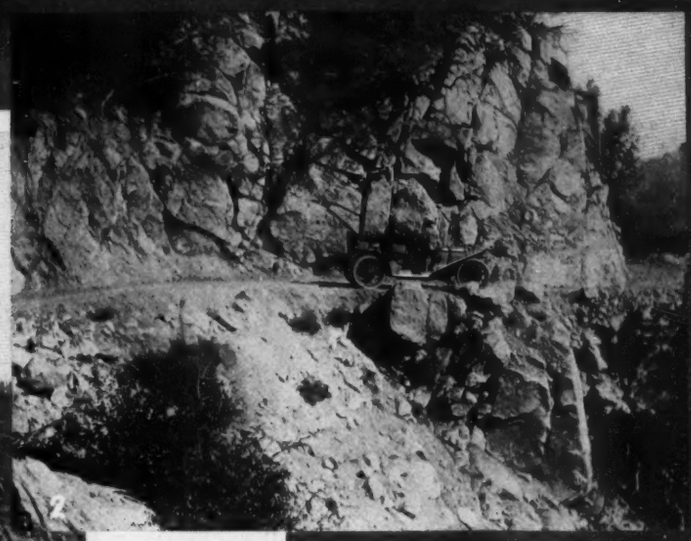
LASTLY, comes the pleased customer. A discontented owner is a thorn in the side of the manufacturer, and a satisfied owner is a patriotic salesman, who is constantly—whether actively or passively—booming the make of car he owns, and indirectly and often directly sending many prospective buyers to the branch or salesroom that handles the make of car he possesses. Satisfied customers are gained by prompt supply of parts needed; quick attention from the trouble man; who spends most of his time on the road among the owners; and the charging of a reasonable price for spare parts. Coupled with this comes a factory patriotism for the cars which extends to the owners and the owners' interest. Not a few owners have been heard to remark, "The car is all right, but I hate the factory treatment." It may be a letter regarding a minor trouble has not been promptly answered; it may be delay in shipping a spare part, or lack of promptness in any one of the many other times in which owner and maker are brought together.

## Dispatch and Attention Win

CLEANLINESS, organization and promptness are three cardinal virtues in any business or profession. They are as important to the lawyer as to the manufacturing magnate, and in motor car manufacturing they are particularly important. The concern that gives the utmost attention to the minute detail; that shows the greatest courtesy on every occasion, and that is always solicitous of the welfare of its patrons is daily increasing its business credit. Next to these virtues comes that of cleanliness in factory departments, in branch offices and repair departments and in everything associated with the factory. Cleanliness sells cars, and will continue to sell them. Fastidious buyers are impressed with a clean, orderly salesroom and are often led to purchase as much because of the environments as because of the car's merits. The slovenly salesman, the hangers-on, and other incumbrances of the selling force, irrespective of the location, are excrescences and useless accessories.

# Mountain Climbing by Motor

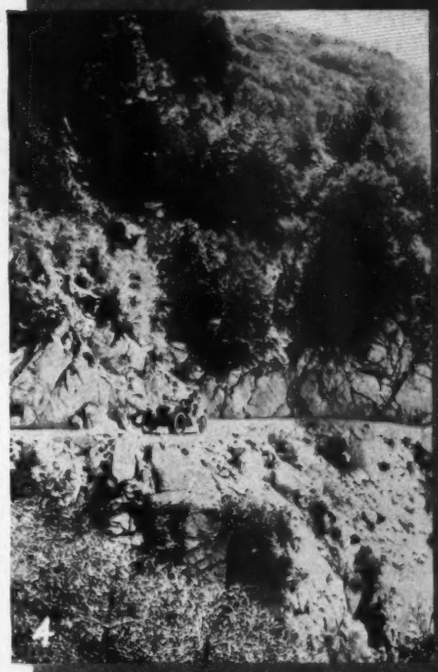
1



2

3

*Six surrounding illustrations vividly depict the possibilities of a motor car for mountain work. The demonstration is in connection with the erection, by the Carnegie Institute at Washington, of a big observatory on top of Mt. Wilson, 14 miles from Pasedena, Cal. This observatory is to contain the giant 60-inch telescope of the institute. The problem solved by the motor car was forming a connecting link between the workshop at Pasedena and the 9 miles to the observatory site. A road has been built, within the last year, which has a rise of 5,200 feet in the 9 miles. To make the ascent on foot or with horses required hours. With a Rambler car which was secured for the purpose 1 hour and 15 minutes were sufficient. The initial trip was made in a leisurely manner because of the sharp turns, two of which are illustrated in Figs. 1 and 6. In other places the road skirts the edge of the mountain, as shown in Figs. 2, 4 and 5, the road constructed being just of sufficient width for a car. In places the grade approaches 25 per cent. The particular value of the car comes in the immense saving of time by the quick transportation it affords.*



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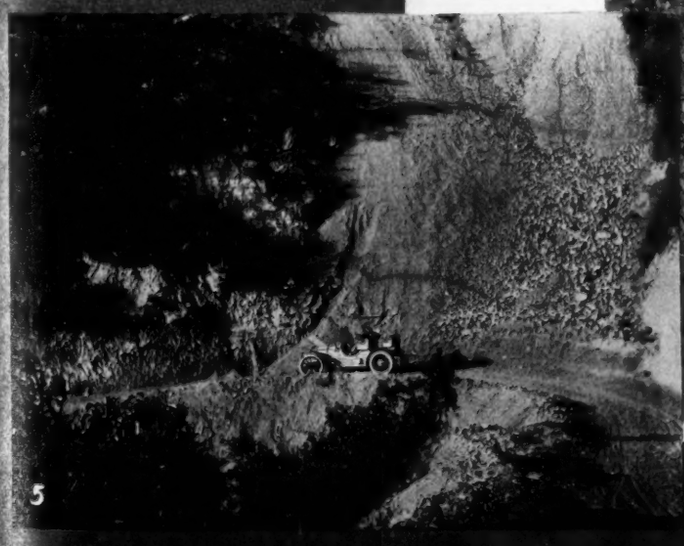

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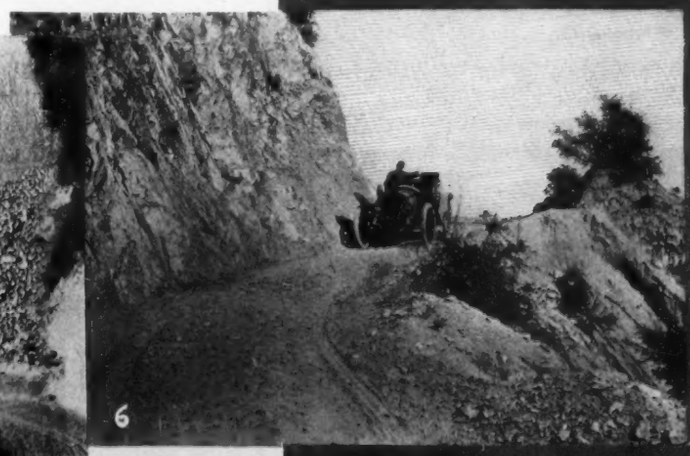


6

# THREE CARS BATTLE TO BREAK BAY STATE TIE

START OF THE BAY STATE A. A. 24-HOUR ENDURANCE RUN AT BOSTON

BOSTON, MASS., Sept. 30—Special telegram—One of the most remarkable motoring contests in the history of the sport is now on as a result of the tie that resulted from the running of the 24-hour endurance run of the Bay State A. A. Three cars, Studebaker, Franklin and Shawmut, are still on the job and tomorrow they start out on the fifth attempt to decide a winner, the route being to Intervale, N. H., via Portland, a distance of 200 miles which must be covered in about 10 hours. These three cars checked in tonight at 5 p. m., all perfect, after having made 205 miles from Intervale to Boston in 11 hours. They now have to their credit 1,367 miles in 83 hours and the tie still unbroken.

These three survivors in the run-off of the tie left Intervale early this morning on the fourth day of the run-off, their course being by way of Bretton Woods and Plymouth to Boston. The three cars had covered 1,162 miles in 72 hours up to last night and apparently were as fresh as ever. Yesterday's run was more than 200 miles, going from Boston to Intervale, N. H., with a control at Portland, the running time being 12½ hours. The roads were muddy all the way.

On Monday, from Boston to Portland and return, 240 miles, Wing's Marmon was eliminated by a broken wheel. The run-off started Saturday, four of the seven survivors of the original run competing and all four finishing still unpenalized. These were the Marmon, driven by F. E. Wing; the Studebaker, driven by Jones and Daniels; the Franklin, driven by Carris and Burns, and the Shawmut runabout, driven by Harold Church. They were ordered to participate in another run-off beginning Monday morning. The Reo and Buick perfect score cars did not complete in the first run-off. The cars eliminated by the test ending Saturday night were the Lancia, driven by Harry Fosdick; the Shawmut tourer, driven by Arthur Ayres, and the Oldsmobile, driven by Hopson and Schneider. The Lancia lost a point while waiting to check in at Bretton Woods, the motor stalling for want of gas. The supply in the tank was low and the car set in such a position that the gasoline did not flow into the carbureter. The Shawmut lost 38 points by being stalled in the sand near Plymouth, N. H. The Oldsmobile lost 8 points, unofficial, for repairs on a broken spring. This car lost much time by tire trouble and did not finish until about 2 o'clock Sunday morning.

**The Original Run**

Boston, Mass., Sept. 24.—Nine of the twenty-one motor cars that started on the 24-hour endurance run of the Bay State A. A. from here to Bretton Woods and return checked in tonight with perfect scores. They were a Marmon, Lancia, Studebaker, Franklin, Oldsmobile, Reo, Buick and two Shawmuts. The cars that were penalized were a Pierce-Arrow, Lancia, Chalmers-Detroit, Rambler, Cadillac, Corbin, Stevens-Duryea, two Buicks and three Overlands. When the run ended all the cars were in except the Overlands, Buick and Stevens-Duryea. The contestants were on the road 22 hours 15 minutes and covered 386 miles. Some of them did 400 and more by going astray. It was a hard trip for cars and men and proved a big success, necessitating a run-off which began 24 hours after the finish of the original run. Under the rules the motor had to be kept going all the time except at Bretton Woods.

It was just 10 o'clock Wednesday night when the first car, a Pierce-Arrow, driven by Harry Knights, was sent away. It was a

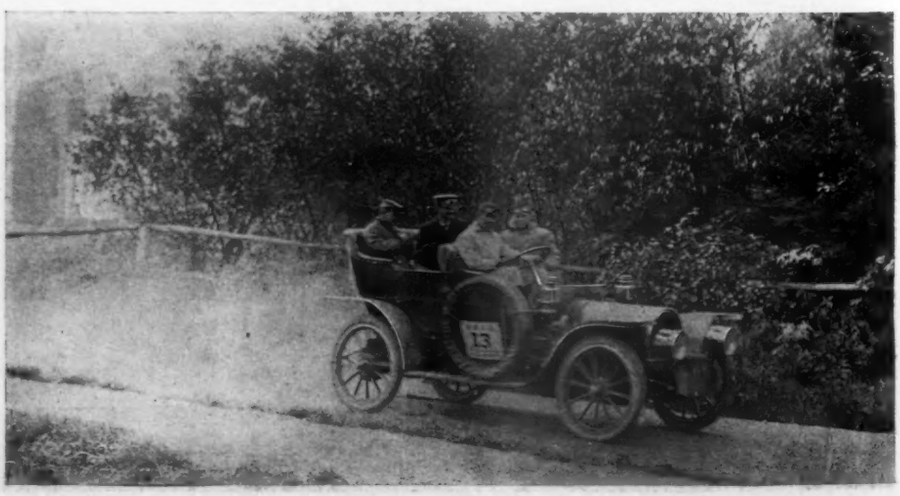
**PERFORMANCES OF TWENTY-ONE CARS IN THE ORIGINAL 24-HOUR**

CLASS A. TOURING CARS

| Car | Entrant | Driver | Penalty | |
|---|---|---|---|---|
| Pierce | Harry Knights | Harry Knights | 2 | Stalled motor. |
| Marmon | Frank E. Wing | F. E. Wing | 0 | |
| Lancia | Hol-Tan Co. | Wm. Hilliard | 74 | 56 carbureter clogged; 15 min. late at Rochester; stalled motor. |
| Buick | Buick Motor Co. | W. L. McKain | out | Kicked by a horse at Plymouth. Did not finish. |
| Shawmut | Shawmut Motor Co. | Arthur Ayers | 0 | |
| Franklin | Franklin Auto Co. | C. S. Carris | 0 | |
| Studebaker | Studebaker Co. | W. J. Jones | 0 | |
| Cadillac | Alvan T. Fuller | H. L. Smith | 22 | Stalled motor; late 21 min. at Boston. |
| Oldsmobile | Algonquin M. C. Co. | J. A. Hopson | 0 | |
| Stevens-Duryea | J. W. Bowman | Geo. Canterbury | out | Gasoline tank punctured near Rochester. Did not finish. |

CLASS B. RUNABOUTS

| | | | | |
|---|---|---|---|---|
| Buick | A. H. Waitt | A. H. Waitt | out | Penalized 12 points on first two controls for stalled motor and being late. Did not finish. |



FRANKLIN, ONE OF THE CLEAN SCORE BRIGADE IN 24-HOUR RUN

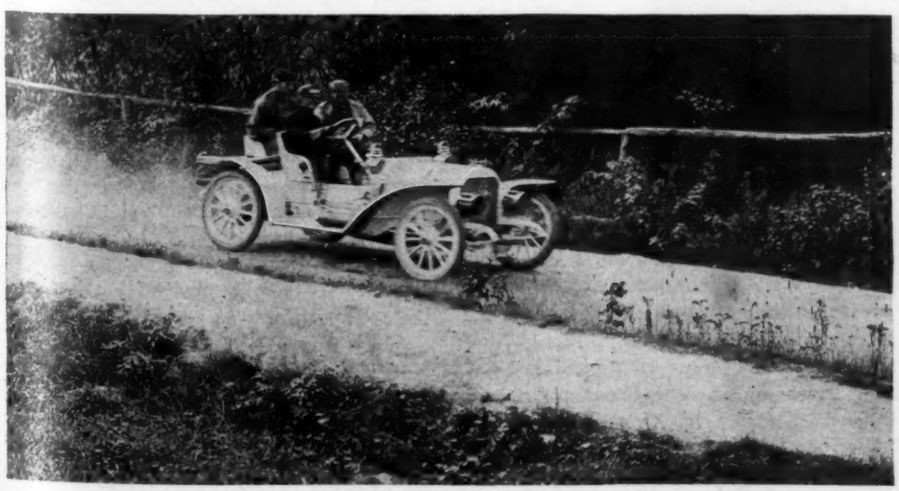
1906 machine that had been driven 30,000 miles and was one of the few privately-owned cars in the run. One minute later Frank E. Wing in a Marmon followed Knights. Then came A. H. Waite in a Buick. William Hillard, holder of the record up Mount Washington, was fourth in a Lancia and Harry Fosdick in another Lancia followed Hilliard. W. L. McKain in a Buick was next and the two Shawmuts with Arthur Ayers and Harold Church driving went off seven and eight. Two Overlands, driven by Frank Wentworth and Harry Dorr, were nine and ten, preceding Oliver Light in a Chalmers-Detroit. E. W. Williams in a Rambler was twelve and C. S. Carris had thirteen with a Franklin. W. J. Jones who drove a Studebaker in the Glidden tour had one of this make and went away after the Franklin followed by Hobson in an Oldsmobile. S. T. Goss had the Corbin and Mrs. Mabel Stearns, the only woman driver in the run, had an Overland. The Stevens-Duryea, with Canterbury, Buick with Coakley and Reo with Pratt followed in that order.

There was a big crowd about at the start, the glare of the lights cutting big rifts in the darkness, the shouting, laughter, chugging of motors and blowing of horns all adding to the excitement, making a very picturesque scene. The men in the cars presented a queer sight, many of them being bundled up as if they were going on an Arctic exploration trip in their cars. Arthur Knights preceded them an hour with the confetti and he had his wife along. Harry Marvin in a Stevens-Duryea went out as pacemaker after Knights, and it was well this car came along as Knights got stuck on the first part of the run and thereafter the Stevens had the job of strewing the confetti, which was well done in addition to the work as pacemaker. Following the cars was a Royal Tourist, with George Dunham driving, carrying some of the committee who went on the long endurance test. The first leg of the journey was to Rochester, N. H. It was 90 miles away and the first part of the route was over the state roads of Massachusetts along the north shore. At that time of night the cars practically had the road to themselves and they swept along the splendid boulevards at a fast clip. The schedule called for 5 hours' running time and that meant a good average. As the machines raced on, their headlights playing on the road, it was one glare of moving light for several miles and those in the rear could see the cars far up in front. Not until within a few miles of Rochester were any bad roads found. The close hugging of the shore made the run rather chilly as the sea air was blowing inshore at the time.

STUDEBAKER WHICH QUALIFIED FOR RUN-OFF OF THE TIE

## ENDURANCE RUN OF THE BAY STATE AUTOMOBILE ASSOCIATION

| CAR | ENTRANT | DRIVER | | PENALTY |
|---|---|---|---|---|
| Lancia | Hol-Tan Co. | Harry Fosdick | 0 | |
| Shawmut | Shawmut M. C. Co. | Harold Church | 0 | |
| Overland | Frank Wentworth | F. Wentworth | out | Broken wheel at Cambridge on return. |
| Overland | Frank Wentworth | Harry Dorr | out | Penalized 31 points for magneto, carbureter, ignition troubles, stalled motor and being late. Did not finish. |
| Ch'mers-Detroit | Whitten-Gilmore Co. | Oliver Light | 96 | Carbureter, 7; stalled motor, 6; transmission, 82. |
| Rambler | Thos. B. Jeffery Co. | E. W. Williams | 1 | Dust in intake valve. |
| Corbin | Corbin Motor Co. | S. T. Goss | 25 | Adjusting steering gear, 17; stalled motor, 1½; late 6 min. at Concord. |
| Overland | Mrs. Mabel Stearns. | Mrs. M. Stearns. | out | Penalized 27 points for broken gas pipe; stalled motor and 13 min. late at Rochester. Did not finish. |
| Buick | Buick Motor Co. | C. H. Coakley | 0 | |
| Reo | J. M. Linscott | Fred Pratt | 0 | |



ONE OF THE SHAWMUTS IN BOSTON'S 24-HOUR TEST

The Pierce and Marmon made the run to there all right but Waite's Buick lost 12 points for stalling the motor and carbureter trouble. Hilliard's Lancia also got into trouble, the carbureter getting clogged so that he spent 56 minutes cleaning and adjusting it. He was late 15 minutes on the first stop. Fosdick's Lancia got through to there easily as well as the next four cars, a Buick, two Shawmuts and the Overland driven by Wentworth. The other Overland was penalized for adjusting its magneto and carbureter. The Rambler Cadillac, Franklin, Studebaker, Oldsmobile, Buick and Reo reached the first control all right. The Corbin skidded off the road and had to adjust its steering gear; Mrs. Stearns' Overland broke a gasoline pope and was late and the Stevens-Duryea punctured its gasoline tank, putting it out of the run.

It was just 3 a. m. when the cars began to check out again from there on the run to the mountains. The cars did not have very much trouble in going up through the mountains as far as power was concerned but it was very thick because of the mists and the smoke from forest fires so the drivers had to use care. Both the Overland and the Chalmers-Detroit were late getting into the mountains, the former stalling its motor and the latter suffering from carbureter

FRENCH CAR CLIMBING 13-MILE GRADE UP MONT VENTOUX AT 50 MILES AN HOUR

trouble and stalling because of it. The running time to Bretton Woods was 5 hours 45 minutes for 92 miles so the greater number of the cars got in about 8, and as they had 1½ hours stop it allowed the tourists a chance to rest and get something to eat. The guests at the hotels swarmed about and inspected the cars during the interval. Hilliard and his Lancia attracted much attention as he was the first to get in, and many remembered him when he made the record climb up Mount Washington a couple of years ago in his Napier.

It was 9:45 when the cars were checked out again from the mountains on the run to Concord. Six hours was the schedule and the distance was 101 miles. It was a hot and sultry trip down over poor roads. There were a couple of long grades over the mountains and Knights in Pierce was the first to go down, stalling his motor when near the top of Profile hill from lack of gasoline, losing 2 points. Light lost a screw from his transmission which held him up more than an hour, and near Plymouth a horse being led along shied and kicked McKain's Buick, putting it out of commission. The Corbin lost time coming down and was 6 minutes late getting to Concord but the other cars managed to get through all right. It was nearly 4 o'clock when the cars began to arrive at Concord and they showed evidence of having plowed through lots of sand.

At 4:45 they began the run home to Boston, a distance of 75 miles, for which a 4-hour schedule was provided. On the way some of them lost the road and had to go back. Additional mishaps were added on this leg. Wentworth's Overland tried to turn out of the car tracks at Cambridge, within 3 miles of the finish, and smashed a wheel. It had a perfect score until then. Waite's Buick, Mrs. Stearns' Overland and Dorr's Overland dropped out along the road and remained unaccounted for. The Rambler got some dust in the intake which caused a loss of 1 point and the Cadillac was late 21 minutes on this stretch. But the others all finished without any bother. It was about 8:30 when Knights, the first to check out, got in and he was closely followed by Hilliard. For the next 2 hours the cars kept coming in and it was a very tired and dusty-looking lot of motorists who got out of the cars. They were stiffened up from riding so long and much of the roads were dusty, sandy and rutty, making it anything but pleasant. In nearly every case the driver that started out stuck to his car to the finish and as they had been up for hours before the start it meant being awake from 36 to 40 hours. The observers, too, showed the effect of the strain and most of the passengers had all the spirit bounced out of them before the finish.

## CHICAGO FIELD CLASSY

Chicago, Sept. 30—While the 1,000 mile reliability run of the Chicago Motor Club, scheduled for Tuesday, Wednesday and Thursday of next week, has not attracted as many entries as the 600-miles event last November, the field will be a classy one, with about twenty cars competing. The lists close tonight and at present there are in the hands of Chairman Root of the contest committee seventeen nominations, as follows: Pierce-Arrow, 2; White steamer, 2; Premier, 2; Haynes, 2; Mason, 2; Knox, 1; Studebaker, 1; Rainier, 1; Franklin, 1; Maxwell, 1; Apperson, 1; Reliable Dayton, 1. The cars will be asked to cover the 1,000 miles in 4 days and the contest will attract such cracks as Hal Sheridan, Arthur Kumpf, Paul Hofmann, W. F. Winchester, Frank Nutt and Loring Wagoner. It is possible there may be several more entries in the mail tomorrow, among the late ones expected being an Oldsmobile and a Midland. All in so far are four-cylinder cars save the Mason and Reliable Dayton.

# GREAT SPEED ON HILL

## Brasier Car Makes 50 Miles an Hour Up 13-Mile Ascent of Mont Ventoux in France

Avignon, France, Sept. 22—After standing for 3 years, the record for the Mont Ventoux climb has been broken. In September, 1905, Cagno covered the 13 miles in a Fiat in 19 minutes 13 seconds. This year Bablot started from the valley in a grand prix Brasier and climbed to the observatory, more than 6,000 feet above the sea level, in the record time of 19 minutes 8⅘ seconds. Conditions were far from being at their best. On starting out the roads were so dry and hard that nonskids were not required; half way up there was a complete change, the mountain road being covered with a thin layer of melted snow that gave little hold for smooth tires on the Brasier.

Mont Ventoux is more than an ordinary hill-climb, its length alone putting it in a class by itself. From the starting point to the observatory the distance is exactly 13.04 miles, with a gradient reaching as high as 20 per cent, certified by the government surveyors. Added to the difficulties of the grades are right angle and hairpin turns with rough surfaces overhanging precipes that are unprotected by either wall or hedge. There are difficulties of carburation, too, the start being in the warm air of the southern valley, the finish around a snow-capped peak. Nevertheless the 155-millimeter racer realized an average of close on 50 miles an hour.

Most of those taking part in the Ventoux hill-climb also figured in the straightaway tests at Salons 2 days previous. Here Bablot and his Brasier shared the honors with Alesy, mounted in a 1906 Bayard-Clement six-cylinder racer. The grand prix Brasier covered the flying kilometer in :21⅘ and in :21⅘, giving an average of :21⅘, equal to 103½ miles an hour. The car was the one which the same driver handled at Dieppe, the additions for the occasion being larger sprockets, a V-shaped wind shield in front of the radiator, and a sheet metal covering for the space between the dashboard and the steering wheel.

The best time made by the six-cylinder Bayard-Clement on the flying kilometer was :22⅕. Though both performances are good they do not come near the record of Hemery in the eight-cylinder Darracq of Florida fame. In the touring car classes entries were plentiful but the events were poorly filled with the result that competition was not of the keenest.

Alezy, and his long, bonnetless six-cylinder Bayard-Clement, which first roared in 1906, made the fastest time in the 5 kilometers, standing start, his official time being 1 minute 52 seconds, equal to an average of 97 miles an hour. Bablot's Brasier occupied 1 minute 54 seconds.

# BIG CUP FIELD SURE

## Vanderbilt Will Have More Entries Than Ever Before, It Is Predicted in New York

New York, Sept. 30—Special telegram—When the list finally closes for the 1908 Vanderbilt cup race, scheduled for October 24, it is assured that the entries will exceed the total in any previous event for this famous trophy. One thing is a certainty, and that is that those that see this year's race are going to witness probably the limit obtainable in motor speed, for the unlimited bore cars will extend themselves faster than ever before over the perfect surface of the motor parkway, supplemented by the adjoining roads which are being placed in as good condition as is possible to make a state highway. While the entries at first fees close in the mail of Friday morning there will still be opportunity for the late comers to enter at double prices, though not more than twenty-five are likely to be permitted to start in the big race.

Paul La Croix yesterday nominated a Renault for the Vanderbilt cup race, while the Matheson Motor Car Co. entered two Mathesons. The day before had come Payne Whitney's Brasier. Today two Locomobile racers, one of which will be driven by George Robertson, were nominated. This, with the Graves Mercedes and the Brokaw Isotta raise the foreign division to six, four fewer than the American contingent, which on Wednesday was made up of two Knoxes, a Chadwick, an Acme, a Thomas, two Mathesons, two Locomobiles and a Mora. It is not expected, however that the last named car will be completed in time for the Mora Motor Car Co. to be represented in the big Long Island road race otherwise than possibly by a stock car. More entries are expected in Thursday's mail.

For the opening of the motor parkway itself, Saturday, October 10, a most generous entry has been made for the several sweepstakes rolled into one as far as the onlookers are concerned, insuring a most pronounced kind of a success for the introduction of the first motor speedway ever constructed.

Up to Saturday night, a week before the date set for the closing of the entries for the motor parkway sweepstakes, twenty-four paid nominations had been made in the five price classes, into which the race is divided. The representation was as follows: Mitchell, 4; Stoddard-Dayton, 3; Knox, 2; Chalmers-Detroit, 2; Isotta-Fraschini, 2; Pennsylvania, 2; Palmer & Singer, 2; Garford, 1; Allen-Kingston, 1; Moon, 1; Maxwell, 1; Lancia, 1; Hotchkiss, 1; Gyroscope, 1.

The sweepstakes promise to be by far the most novel and at the same time most exciting struggle yet conceived for motor cars. The idea practically combining five races in one by starting the five fields at the same time, is a radical innovation that probably will become a feature of future stock car racing in this country. The large number of contestants will insure cars constantly racing and passing one another all along the course. The distances for the various classes differing, there will be added after the first 3 hours the excitement of successive finishes for the $1,000 prizes, offered each price division.

Spectators on the home stretch will be treated to a noteworthy innovation in the establishment of a depressed official supply station stretching for 300 feet in front of the grand stand. It will take the form of a pit 10 feet wide and 5 feet deep and will be reached by a switch from the main course. Here will be kept tires, oil, water, and gasoline.

There will be another official supply station established on the backstretch somewhere along the old Jericho turnpike. It will not, however, be depressed. The supply men will be separated, though, from the course by a railing. In neither of the races can supplies be taken on elsewhere than at these official stations. No tires can be replaced except at these stations, except those whose tires have been thrown between stations and an extra tire has been carried on the car.

The grand stand, which is being built on one of the mail stretches of the cement parkway, is nearly completed. It will seat 5,000 spectators. It is divided into nine sections, each section containing thirty-four boxes, or 306 in all.

Three-quarters of a mile on the old Jericho turnpike is being resurfaced. The dangerous "flatiron turn" at the Jericho turnpike, and the Woodbury road is being rounded for safety. A new road is also being built across Hempstead Plains to the beginning of the parkway. It is ¾ of a mile in length and 18 feet in width. Twenty-two thousand gallons of oil are to be spread on the 14 miles of county and state roads included in the Vanderbilt circuit.

Equipment houses are beginning to offer big money to drivers. The Michelin Tire Co., for instance, will give $1,000 to first, $750 to second, and $500 to third in the Vanderbilt, providing the cars winning those places are shod with Michelins.

The American end of the Savannah grand prize race was given a boost today by the announcement that Harry A. Lozier had entered a Lozier. The noteworthy feature of the nomination was the fact that the machine in question is not a stock car but a racing machine out and out, which was begun at the factory in June and is said to have been so far completed as to have for some time been subjected to tuning up on the road. This raised the American contingent of candidates to four, a Locomobile, an Acme, and a B. L. M. having been formally entered previously.

BABLOT IN BRASIER ON DANGEROUS CURVE IN MONT VENTOUX CLIMB

## MORE QUAKER ENTRIES

Philadelphia, Pa., Sept. 28.—There are now an even dozen of bona fide entries for the 200-mile founders' week stock chassis road race, which is to be run off over the 78-mile course in Fairmount park on Saturday, October 10—besides the quintet announced last week—Maxwell, American Locomotive, Stoddard-Dayton, Peerless and Studebaker—there will be an Apperson Jackrabbit No. 3, to be driven by George E. Davis; a six-cylinder 45-50-horsepower Acme, driven by Cyrus A. Patschke; a six-cylinder 50-horsepower Chadwick, driven by Jack Harkins; six-cylinder Thomas, driven by George Salzman; Pennsylvania six, driven by Bob Maynes, and a pair of Locomobiles, one driven, possibly, by Joe Tracy, the other by Jim Florida.

# WHITE sets Mile Record at San Francisco

WHITE STEAMER CREATING MILE RECORD FOR STOCK CARS ON TANFORAN TRACK

SAN FRANCISCO, Cal., Sept. 22.—The second annual race meet under the management of the Olympic Athletic Club was held Sunday afternoon and proved a great success. In spite of the fact that the races were held at the Tanforan track, which is across the county line of San Mateo, several miles from this city, the crowd numbered 7,000 people. The grandstand was packed, while hundreds of people filled the enclosures, and hundreds more remained in their own cars during the progress of the meet. It is estimated that 700 cars went down from San Francisco or came up the peninsula from the south. No actual count was made, but this estimate is based on the receipts of the box office at the motor car gate. It was a remarkable exhibition of the interest taken by the people generally in the sport of motor racing. But for the fact that when the cars left San Francisco it was raining, it is believed that the crowd would have been doubled. At any rate the crowd was a satisfactory one, and the people got their money's worth.

The honors of the day lay with the Stoddard-Dayton, Buick, Comet and White steamer. The Stoddard-Dayton, driven by Fred J. Wiseman, kept well up to the winning streak that it has struck during the past few weeks in California, taking every race in which it was entered. It started out with the 10-mile race for cars of $2,750 and under. There was special interest in this race because it marked the first appearance on the coast of the Chalmers-Detroit Bluebird, which brought with it a record of victories won in the middle west and in southern California. Bert Dingley was at the wheel of the Bluebird, and Dingley, as one of the drivers in the Gordon Bennett and Vanderbilt races, naturally commanded respectful attention. For a lap or two it was a hard fight, but after that the Stoddard-Dayton maintained its lead nicely and finished an easy winner.

WINNING STODDARD-DAYTON ON ONE OF THE TURNS

The Stoddard-Dayton repeated its victory in the 10-mile race for cars listed from $2,500 to $3,500. There were two White steamers in this, but they did not behave very well, so the Stoddard's principal opponent was again the Chalmers-Detroit. Dingley had changed the gear of the Bluebird, believing that the track was sufficiently fast to make this advantageous. He was to be disappointed again, however, for the victory of the Stoddard was even more pronounced in this race. The Chalmers had to do its best to beat out a White for second place, the steam car having gotten into good shape and made big gains.

Victory came a third time to the Stoddard-Dayton in the free-for-all, in which it met two of the fast Comet cars and a 30-horsepower White steamer. The steamer went out in the second lap and one of the Comets a little later. The second Comet, however, gave the Stoddard a very hard run for several laps, but was finally distanced by the cars from Dayton which showed a rare turn of speed in this event.

The little Buick also maintained its remarkable record of victories in California. It started out by winning the 5-mile handicap race for members of the Olympic Club, defeating a Peerless touring car and a Thomas 60 roadster. Its handicap was 5 seconds, hardly more than enough to get it well started. Later it won the 10-mile contest for stock cars listed at $1,500 and under.

A world's record for stock cars, fully equipped, on a circular track is claimed for the 30-horsepower White steamer driven by Fred Dundee in the 10-mile race for cars listed at $3,500 and over. In the second lap of this race, despite the heavy track, the White reeled off the mile in 1:02, which it is claimed never has been excelled. It should be noted, however, that the White was stripped to the extent of having removed its lamps and mud guards.

The Comet did not entirely live up to its sensational record, although its work in the novelty race was one of the sensations of the day. There were two cars of the Comet model in this contest, competing against a number of other machines. Both of the cars were very slow in getting their wheels turning, and by the time they were under way all their opponents were a considerable distance ahead, so that it seemed impossible for the little machines to catch up. Once started, however, the Comets went like a whirlwind and made some of the other cars look as if they were standing still. One of them captured first place, while the other took third. The Comet shared with the White the honor of making the fastest mile of the day, covering the distance in 1:02. Summaries of the meet:

Five miles, handicap race for members of Olympic Club, members driving—Buick, driven by Charles S. Howard, won; Peerless, Max Rosenfeld, second. Thomas Sixty roadster, driven by Nat Boas, withdrew in third lap. Time, 6:08 1-5.

Ten miles, stock cars listed at factory $2,750 and under—Stoddard-Dayton, driven by Fred J. Wiseman, won; Chalmers-Detroit Bluebird 40, Bert Dingley, second; Buick, C. S. Howard, third. Time, 11:11 2-5.

Ten miles, stock cars listed at factory $1,500 and under—Buick, C. S. Howard, won; Sunset, T. Hart, second; Buick, Frank Murray, third. Time, 12:10 2-5.

Ten miles, stock cars listed at factory $2,500 to $3,500 inclusive—Stoddard-Dayton, J. Wiseman, won; Chalmers-Detroit Bluebird, Bert Dingley, second; White steamer, 30-horsepower, Fred Dundee, third. Time, 11:25.

One mile, novelty race, machines on scratch with engines dead, drivers back 100 yards from cars, run to machines, start same and go—Comet, F. Free, won; Buick White Streak, Howard, second; Buick, Frank Murray, third. Time, 1:41 3-5.

Ten miles, stock cars listed at factory $3,500 and over—White steamer, 30-horsepower, driven by Dundee, won. Thomas Sixty touring car, driven by V. Verilhac, withdrew in fourth lap, and Peerless, driven by C. Kellogg, withdrew in ninth lap. Time, 11:16.

Ten miles, free-for-all — Stoddard-Dayton, driven by Fred J. Wiseman, won. Time, 11:21 4-5.

## HOOSIERS WILL HAVE RUN

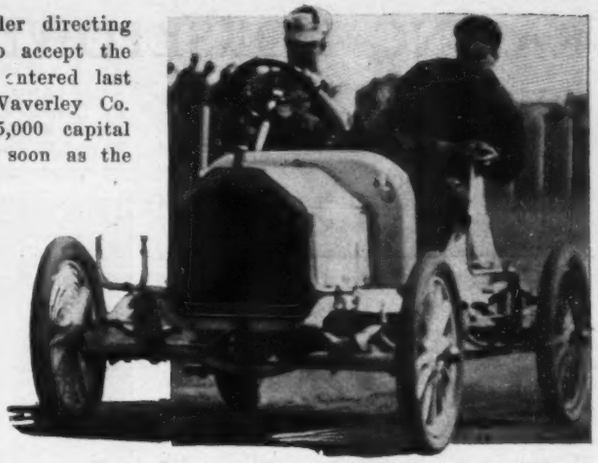
Indianapolis, Ind., Sept. 29.—A rain, the first in almost 8 weeks, fell over central and southern Indiana Sunday night, thus assuring the 2-days' reliability run Thursday and Friday. The run is to be under the auspices of the Indianapolis Automobile Trade Association. Frank L. Moore, chairman of the contest committee, stated last night that the following entries had been received: Three Nationals, one Stoddard-Dayton, one Overland, one Maxwell, three Jacksons, two Studebakers, two Marmons, one Rambler, one Mitchell, two Maxwells, one Rapid truck. There will be three classes, as follows: Class A, 1907, 1908 and 1909 touring cars, runabouts or roadsters at $2,500 or over, to run at 18 miles an hour; class B, 1907, 1908 and 1909, stock touring cars, runabouts or roadsters at $1,200 up to $2,500, to run 16 miles an hour; class C, 1907, 1908 and 1909 stock touring cars, runabouts and roadsters or buggyabouts under $1,200, to run 14 miles an hour. The run is to be to French Lick and return.

## LAUTENSCHLAGER INJURED

Stuttgart, Sept. 22.—Lautenschlager, the winner of the grand prix of the Automobile Club of France, has met with an accident which may prevent him racing again this season. While testing the 155-millimeter racer which he was to have driven in the Vanderbilt cup race, the Mercedes driver burst a tire on one of the turns of the factory track and came into violent collision with a wall. Lautenschlager's wrist was broken and most of the bones of his hand laid bare. A complete rest of 1 month has been ordered by the doctors.

## WAVERLEY PLANT SOLD

Indianapolis, Ind., Sept. 28—As has been anticipated for some time, Judge Anderson of the federal court here sanctioned the sale of the Waverley plant of the Pope Motor Car Co. to capitalists represented by Herbert H. Rice, manager, and Wilbur C. Johnson, assistant manager of the plant. The formal order directing Albert L. Pope, receiver, to accept the cash offer of $200,000 was entered last Friday. Immediately the Waverley Co. was incorporated with $225,000 capital and will take possession as soon as the transfer can be made. Those who are interested in the Waverley Co. are all local capitalists, as follows: William B. Cooley, Carl von Hake, Hugh Dougherty, William F. Kuhn, William Kothe, Jr., John R. Love, Hugh M. Love, Joseph C. Schaf, Burton E. Parrott, Herbert H. Rice and Wilbur C. Johnson. The new Waverley company has been formally organized with Mr. Cooley as president; Mr. Rice, vice president and general manager; Mr. von Hake, treasurer, and Mr. Johnson, secretary and assistant manager. There will be no change in the business of the company, at least not at this time. It is announced that the company will continue the manufacture of Waverley pleasure and commercial vehicles exclusively, devoting tis attention to electric cars as previously. Mr. Rice and Mr. Johnson had been with the Waverley branch of the Pope Motor Car Co. since 1904.



BUICK, TWICE WINNER AT TANFORAN

## ITALY OFFERS RICH PRIZES

Bologna, Italy, Sept. 21.—Satisfied with the excellent results of the races just held, the Automobile Club of Bologna will next year hold a race under the prevailing grand prix regulations—whatever they may be—and will offer special attractions in the form of $40,000 cash prizes. The decision was arrived at at the closing banquet of the recent meet, when a subscription list was opened for next year's event. First prize will be $10,000, second, third and fourth being awarded smaller amounts. The amount promised already reaches $6,000. It had been understood that no race should be held in Italy next year, the second edition of the grand prix being held on the Belgian Ardennes course. Evidently there is no intention of adhering to this agreement on the part of the Italians who are now boosting the Bologna race as much as possible.

## MITCHELL WINS UNIQUE CONTEST

Wilmington, Del., Sept. 28.—In last Saturday's blind handicap of the Delaware State Automobile Association over a 70-mile course to Coatesville, Pa., and return, there were twenty-three entrants. The secret time schedule for the distance was 4 hours and 30 minutes, and William J. Hammond, in a 20-horsepower Mitchell, was awarded first prize, being but 8 minutes shy of the time. Charles C. Kurtz, 12-horsepower Franklin runabout, was second, 9 minutes wide of the mark, and William Stainer, 12-horsepower Franklin, third, with 11 minutes. Robert S. Baird, president of the Evening Journal Publishing Co., and Gilbert S. Jones, business manager of the same paper, met with a painful accident near Chatham, Pa. Their Stoddard-Dayton skidded into a ditch and upset, Jones receiving internal injuries and Baird severe lacerations from being catapulted against a barbed wire fence. Otherwise the run proved to be most exceptionally interesting to the contestants.

COMET, A CALIFORNIA-MADE CAR WHICH HAS BEEN A CONSISTENT WINNER

# RATING HORSEPOWER IN MOTOR CAR MOTORS

**EDITOR'S NOTE—Part II of paper prepared by Thomas J. Fay, President Society of Automobile Engineers. Part I appeared on pages 26 and 27 Motor Age issue September 24.**

EVEN in the four-cycle motor, the mixture is far from free of burnt residue, though the conditions are extremely good as compared with the two-cycle motor. If a formula cannot be devised that will serve for the four-cycle motor, it will be a waste of time to try to devise one for the two-cycle type. In the main, it is not essential to success to predetermine the exact power, because, if experience dictates that a certain size of motor will serve a certain purpose, it becomes a matter of the construction of the motor to meet the conditions to be satisfied.

If the ability of a motor cannot be predetermined with satisfying certainty, the natural question is: How can this ability be established in actual practice? In fixing upon this, the question will also arise as to whether it is to be the highest instantaneous value, or the average value, involving enough time to fix upon the latter with certainty. The Prony brake affords a means of determining the instantaneous value of the power, but it is not believed this method serves if a considerable time factor intervenes, due to the difficulty involved in disposing of the heat into which the energy is converted. A superior means, affording a long time run, involves a dynamo and the requisite instruments. Certainly there is a material difference as between the power of a motor as it is observed by means of a Prony brake, and the power average of fixed time readings for a long interval of time.

The instantaneous brake readings are likely to be influenced by the flywheel effect, and it is possible to so adjust the carbureter as to produce results that cannot be maintained for a long time. It is also possible to so time the spark as to influence the readings in favor of a high rating, if it is not necessary to maintain that adjustment for a long time. The cooling question is also one that has a bearing upon the matter, the power of a motor being affected by the temperature of the motor. If a motor is quite small, and the Prony brake is very well designed, it may be that a considerable degree of success can be realized, but the best that the Prony brake affords is not nearly so good as the results following the use of the electrical system of testing.

While the various instruments of precision, and the general equipment used in testing, will be treated in detail in a special chapter, it may be well here to note that the Prony brake is of the absorption dynamometer genera, and depends for its success upon its ability to absorb and dissipate the heat equivalent of the mechanical effort of the motor. This heat absorption, and especially the after dissipation, is generally attended with considerable difficulty, since if the temperature increases over much, the brake shoes do not behave in a manner to admit of steady readings.

The Prony brake consists essentially of a set of brake shoes, of any suitable design, attached to a lever arm—usually counter-

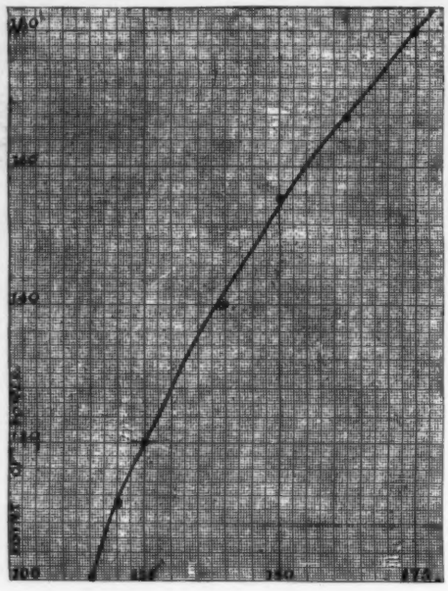


FIG. 1—STROKE IN MILLIMETERS OF FOUR-CYLINDER, FOUR-CYCLE MOTOR

balanced—with a means of adjusting the tension of the brake shoes and a suitable scale for weighing in pounds the force exerted at the end of the lever arm.

The customary length of the lever arm is 5 feet 3 inches for the following reason:

$$\text{H. P.} = \frac{S\ P}{1{,}000}$$, in which S = angular velocity of the crankshaft, if the brake shoes are attached to a drum that rotates at the same speed as the crankshaft, usually the case; P = the pull in pounds at the radius of the lever arm, usually 5 feet 3 inches, as before stated. If the length of the lever arm differs from that given, the formula must be altered to suit. For any other length, the formula becomes:

$$\text{H. P.} = \frac{2\ R\ S\ P}{33{,}000}$$, in which the symbols are of the same values as before given.

The brake drum should preferably be of the same diameter as the flywheel, on the ground that cast iron—the usual material—will not be safe to use of a greater diameter, provided the flywheel is of the maximum allowable for cast iron. At all events, it will not be desirable to use a cast-iron brake drum of a diameter so great as to fix the peripheral velocity in excess of about 1 mile per minute, at the normal speed of the motor. Even this would be a high value in some cases, involving motors with relatively large valves. The drum must be water-cooled, and for good results it is desirable to maintain the water at a constant temperature, which can only be accomplished by running water through the jacket of the drum. It might also be well worth while to have the brake shoes well water-jacketed.

The brake shoes to serve the purpose have to be faced with some material that will have a nearly constant coefficient of friction, notwithstanding the severe changes in temperature, which is a matter of some concern, since but few materials seem to serve with any degree of satisfaction. Cast-iron brake shoes with cork inserts would probably come nearer doing the work than any other means. Certainly leather, or any other material that carbonizes, would not serve at all. With the cork inserts in the shoes, the question of cast iron to the same would not come up, and for a given diameter—fixed by considerations of safety—of the brake drum, the face of the shoes—slightly less than for the face of the drum—would be as follows:

$$W = \frac{350 \text{ by } H\ P}{V}$$, in which $W$ = the width of the shoes in inches; $H\ P$ = the probable maximum horsepower of the motor; $V$ = the peripheral velocity of the brake drum in feet per minute, which for convenience might be fixed at 5,000 feet.

For a 50-horsepower motor with a 22-inch brake drum, the face would be as follows:

$$W = \frac{350 \text{ by } 50}{5{,}000} = 3.54$$ inches; the drum might well be 4 inches, thus affording a little margin.

The above will only hold true if cork inserts are provided in the brake shoes and with the water maintained at a fairly constant temperature. The scales might all be of the beam type, of the better grade, with the arm graduated to quarter pounds, or finer. The means for putting tension on the brake shoes should be quick-acting and operate by minute increments. Indeed, it is in connection with this detail of the design that most Prony brakes become so very troublesome as to debar their use, unless for the most crude and unreliable tests. With a crude method of altering the pressure, the shoes chatter and the scale readings become a mere guess.

The speed in revolutions per minute cannot be taken by means of an ordinary speed counter, a calibrated tachometer being absolutely necessary, the finer—dead beat—types giving instantaneous values.

Safety is a matter so much to be kept in the mind's eye that it will not be out of place to call attention to the dangers to be encountered in the use of the Prony brake. In a cast iron wheel, no matter what the area of the section of the rim, the centrifugal force, resulting from the speed, will set up a tension in the rim independent of the area of the section.

In testing a motor, while the normal speed may be quite low, the chances of the "free" speed being very much higher are very great. The normal speed of a motor might be, say, 1,000 revolutions per minute, while

its "free" speed might be 3,000 revolutions per minute. This would be a little unusual, since it seems to be the case, in general, that the best power of a motor lies somewhere near two-thirds of its free speed. At all events, if cast iron is the material of the brake drum, and it is designed for 5,000 feet per minute at the normal speed of the motor, it becomes necessary to consider what would be the result of three times that peripheral velocity.

For cast iron the tension in the rim section would be: $T = \frac{V^2}{10}$, in which $V^2 =$ the square of the peripheral velocity in feet per second; $T =$ the tension in pounds per square inch.

For the case in point: $T = \frac{250^2}{10} = \frac{62{,}500}{10} = 6.250$ pounds, per square in. $V = \frac{15{,}000}{60} = 250$ feet per second from 15,000 feet per minute.

Cast iron is a product upon which no reliance can be put beyond a certain point. It matters little that tests showing as high as 35,000 pounds per square inch—tensile strength—can be cited; it is not safe to accept over 18,000 pounds per square inch, or even this figure in a case of this sort, unless the castings are very good indeed from well-executed designs and in accord with the characteristics of cast iron. Even so, the factor of safety is not quite what it ought to be, while on the other hand, it is not well to reduce the diameter of the brake drum below the possible maximum, considering cast iron. If steel castings are adopted instead, then the diameter might well be at least 24 inches, on the ground of a better performance of the brake.

As it is, the factor of safety is barely three to one, and it is true also that no account has been taken of the fact that the brake drum must survive under severe conditions of service, due to variable pressures and sudden changes in temperature, for, even if the waterjacket is well devised and the attendants look well to the details of the task, the time will come when the drum will be allowed to heat up to the maximum for the work. Perfectly uniform walls of no great thickness will best serve the purpose, in the case of the brake drum, for then the metal will be of the greatest unit strength, defects will not be so difficult to discover, and the heat will be the more readily disposed of. In designs of this sort, perfect symmetry is of the greatest importance, and at such high speeds the drums must be statically and kinetically balanced, the radii must be liberal, and thick sections of metal should not be directly attached to thin sections.

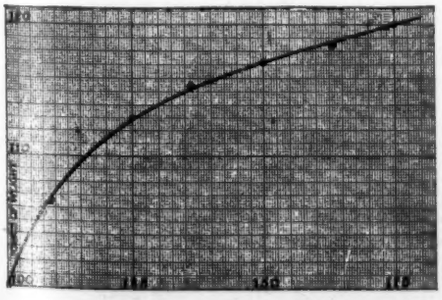


FIG. 2—STOKE IN MILLIMETERS FOR FOUR-CYLINDER, FOUR-CYCLE MOTOR—BORE EQUALS SHORTEST STROKE

Before motors can be tested they must be designed and constructed, while the test equipment must also be devised on a basis of the probable requirements. Leaving entirely aside the question of the extent to which precedent may be followed, principles must be uppermost, unless a "Chinese copy" of some motor already built and of known characteristics is the sole product. The motor must be designed specifically for the car it is to actuate. If it is heavy, the car will be heavy in two ways; that is, for two reasons, which may be set down as follows:

A. The heavy motor will add weight to the car.

B. The chassis framing must be made rigid and strong in proportion to counteract the ills of the extra weight in the motor.

The power of the motor will be in proportion to the square of the diameter of the piston—bore of the cylinders—will bear some relation to the number of the cylinders, and will, furthermore, be influenced by the stroke. The power requirement is dependent upon the weight of the car, the attainable speed and the wind resistance, which becomes a factor, if the speed is above 20 miles per hour. There are numerous other influences besides, as the road, tires and the details of design of the car as a whole. The right motor for the purpose then will be the one as follows:

I. Adequate in point of power for the intended service.

II. Of the maximum "weight efficiency," without sacrificing stability.

III. Of the utmost thermal efficiency, consistent with the above considerations.

To have the motor as light as possible, without considering the cost of maintenance, would be as much of an error as to design for the highest possible thermal efficiency without respect for the weight efficiency. It is unfortunate that the thermal and the weight efficiencies are not coincident.

The stroke has an important influence on the two efficiencies, barring the question of compression, and is the topmost factor of control. The short stroke motor is the lightest in weight, while the long stroke motor will show better in point of thermal efficiency. Where to draw the line is a matter that practice has never settled, because in practice the stroke has receded from 12 to 4 inches, and now that it is very short, the tendency is again to increase it. The cost of fuel renders it desirable either to bring about a reduction in its price or to strive for a higher thermal efficiency.

For some years the stroke has held between 7 and 4 inches with but very few over 6 inches. The 1909 cars will be largely of the very short stroke type, mostly with four cylinders and rather high speed, with quite large valves in proportion and a fairly high compression, as motor car motors go. Motors so designed will be light, and the power will be that for a high weight efficiency rather than for a high thermal efficiency. Abroad there is a recession to the lengthened stroke, in view of the hankering for a higher thermal efficiency, since it is in France and Germany that fuel is expensive.

To what extent it is desirable to lengthen the stroke to placate the buyer of the fuel is a matter not so acute in America, because in this country fuel is not so expensive, while on the other hand the roads are not so good. This latter consideration is one of some import, for with inferior roads high weight efficiency becomes the matter of moment. High thermal efficiency, at the expense of weight, is something to consider, if the roads are good. In other words, the amount of fuel used, if the roads are not so good, will be least in the case of the lighter motor car of lower thermal efficiency.

To what extent the stroke is responsible for increased weight, on the one hand, and increased thermal efficiency on the other hand, is a matter not so easy to dispose of. That the weight will be materially less if the stroke is short goes without saying. The extent to which the short stroke decreases the thermal efficiency, however, is not a matter to be disposed of offhand. Not considering the carbureter, it will be possible to indicate the lay of the land, as the stroke *per se* tends to influence the situation. The curve, Fig. 1, shows the increase in horsepower attending an increase in stroke, with a fixed bore and all other conditions as nearly constant as possible. This curve cannot possibly be regarded as representing an abstract situation, apropos of all motors and of the widest range of cylinder dimensions. It is strictly limited to motors of bores less than 8 inches and over 4 inches. These limits must be applied, because numerous conditions will render themselves manifest if the bore is increased very much, while very small motors are a law unto themselves.

From the curve it would appear as if the very short stroke motors would scarcely afford the ability necessary to render their construction desirable, or may we say profitable. Short stroke motors deliver power on a high plane from the weight efficiency point of view, and it is only relatively that they

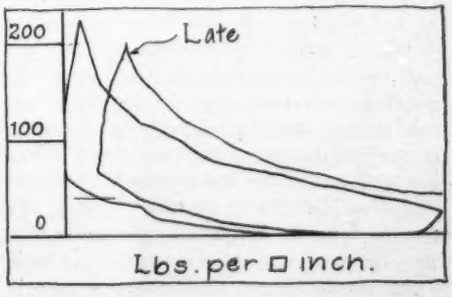



FIG. 3—SHOWING A LATE SPARK RESULTING IN A REDUCTION OF TORQUE AND POWER AS WELL

look so discouraging. To illustrate this situation, it will be necessary to give evidence by way of a weight efficiency curve under as nearly the same general conditions as the author can, in view of the difficulty involved, due to the lack of uniformity of the data extant.

Fig. 2 shows the decrease of weight efficiency, as the stroke is increased, considering a constant bore and a constant piston speed. This is given merely to show the trend, and is quite as accurate as it can be under the conditions governing the comparison.

The conclusion to be reached is that the power will be doubled if the stroke is doubled—starting with the shortest stroke in vogue—while the weight efficiency will change to 120 points for the long stroke as compared with 100 points for the short stroke. Thus it would seem to be a good thing to increase the stroke, especially if we look no further. But the increase in points on the weight efficiency scale means an increase in the actual weight of the motor of 100 per cent. This is vastly more than would obtain for double the power, if that increase were to be effected by means of an increase in bore, rather than by doubling the stroke. Indeed, double the power might result with an increase of 50 per cent in weight by changing the bore and sticking to the short stroke. Obviously, the long stroke is not so valuable, if the car is to be light, or will the increased thermal efficiency be of such value as to make up for the fuel cost of "toting" the increased weight over the average American roadway.

It is true that the thermal efficiency will be higher in the case of the longer stroke motor, because the scavenging is more complete, and the time per phase of each cycle is greater, the number of oscillations of the mixture in the intake is less, since for a given piston speed the number of changes in direction are reduced. But there are other considerations besides, as for illustration, the timing is more exact, the lag of the spark being considerably reduced, if the stroke is considerably longer. The valve action is sharper, more pronounced, and losses in the passageways are less noticeable. No mention has been made of the differences in mechanical losses, the inertia component of the reciprocating mass being more pronounced, if the stroke is short, the piston speed being the same for both. This latter consideration will be subject to a correction, if the long stroke motor is designed in such a way as to have massive reciprocating members; very often the case.

It cannot be claimed that the long stroke motor has an advantage on any count involving the initial compression, because it is possible to show that the short stroke motor is amenable to whatever treatment will afford benefits by way of adjusting the compression. It will avail nothing to discuss the question of increasing the piston travel in the long stroke motor, because it is the short stroke motor that best withstands such treatment; or is it due to the more complete expansion in the long stroke motor that the increase in power is to be expected. The increase in power is largely due to the more nearly constant compression and the more nearly "flat top" curve of torque. In the short stroke motor the "cold compression" is quite as high as in the motor of the longer stroke, and there is no reason why the initial compression should be less in one than it is in the other.

At the higher speed of the short stroke motor the torque falls off, and it is not so to the same extent in the long stroke motor. It is principally in this regard that the short stroke motor offends, and on this account more than for any other reason, increasing the stroke increases the power.

In finishing cylinders, if the stroke is great, the bore will be conical, since finishing to a considerable depth in a blind hole evolves conical results. Many claim to be able to finish to a fraction of a thousandth even if the stroke is very long; doubtless they can, but not at a cost allowable in practice. There are a large number of parts in motor car, and the cost of the finished product must be very low in comparison. The design of each part must be such that the work can be done by men available in the open market. Leakage is more of a detriment in the long stroke motor, because there is more time in which the mixture may escape. If the long stroke motor is more difficult to finish, the chances of leakage are greater. It follows, therefore, that the initial—apparent—advantage is, to some extent, at any rate, a theory. It is not the purpose here to make predictions, but to call attention to the two sides of the matters to be considered by the designer before he commits himself, especially in view of the fact that once the design of a motor is crystallized, it is then too late to make any substantial change.

In the "Car and the Lady" Percy F. Megargle with the assistance of Grace S. Mason tells the story of an imaginary motor car race from New York to Portland, Ore., between an American car of the two-cylinder type and a big four-cylinder Italian car, the stake to the winner being the daughter of a wealthy manufacturer whose money was wanted for the manufacturing of motor cars. Naturally Megargle after his Reo experiences places the winner in the two-cylinder machine made "up in Michigan" and which all through is delineated as the typical car for American roads and mountain work because of the suspension of the motor midway between the axles. The facts of the race are based on Megargle's own experiences, and the names of real places add not a little to the interest of the affair. While the thread of "fighting for love" permeates every part of the trip, yet a realism equally permeates every part, because every misfortune that befalls both machines is daily happening to motorists, and the repairs are practical ones and not those ideal conceptions so often met in story books. The road conditions are those of the west, the authors picking out the most thrilling and eliminating those of a staider shade. The passage of incidents is fast and variable. Jerry, the driver of the car typified as the "all-American machine," is in love with Betty Albright, whose father has the money with which Jerry hopes to build his cars. The problem is to get the money. His adversary is Vannuccini with a dashing red Italian car christened Superba, which, with its 60-mile-an-hour propensities, on good roads far outstripped Jerry Fleming's two-cylinder creation. From New York westward the vicissitudes common to the course of "true love" are in evidence. Jerry falls into dried river beds and has his shoulder dislocated, losing valuable time; at another time the car is nearly burned by mountain raiders; and again days are lost in rescuing a mountain belle from her pursuer. After a course of gallantry the final test is a morass that has to be crossed. Jerry cuts saplings and makes a road for his car. The Italian refuses to help, but makes use of the road. Jerry decides that if light branches are cut they will support his light car but not the heavy Italian machine. The scheme works. The little car crosses and strikes the good roads to Portland, only 50 miles away, while the Italian machine sinks over the radiator, and while Vannuccini searches for horses Jerry Fleming makes the goal and wins the prize. The book is published by the Baker & Taylor Co., New York, N. Y.

"The Amateur Motorists," by Max Pemberton, motoring editor of the Sphere, is a 300-page cloth-bound volume, well illustrated and covering in practical fashion the man, the car, some of the cars, touring, and the motor cycle. It is a serio-humorous-practical-technical book; one for the amateur to learn about the car parts and how to drive, one in which the designer can pick up plenty of pointers, one in which the road driver will revel, and one in which the maker can peruse a few pages to advantage. In talking about carbureters the author becomes technical and uses draughtsmen's drawings freely, showing the different types and dilating on their advantages. The other systems of the car are gone into with equal detail. The book is admirably suited for the motorist who does not know but wants to, and who enjoys the spice of society and touring incidents mixed in. It is a technical book without the exterior finish of such. Much of its value lies in the wealth of personal experiences it contains, all of which the amateur is in need of and should possess. It is published by A. C. McClurg & Co., Chicago.

# Motor Car Shop Kinks

## Aids for the Amateur

### CAUSE OF OVER-RICH MIXTURE

OVERHEATING of the engine, when it is not traced to poor circulation is almost always caused by too much gasoline. There are, however, many possible causes of over rich mixture, some of which on the face of them might seem rather to be causes of lean mixture rather than rich. Prominent among these latter is too low a gasoline level in the float chamber due to the float valve closing too soon. The immediate effect of this is to make the mixture too lean at starting and at low speeds. Starting is therefore difficult, and if the auxiliary air valve begins to open at the usual motor speed the mixture will again be much too lean. These symptoms, however, unless properly interpreted will probably lead the owner to increase the gasoline supply, or to adjust the spring tension of the auxiliary valve so that the latter will not open until quite high speed is attained. In other words, he adjusts to give a suitable mixture at one speed and at other speeds the mixture is extravagantly over rich. It is well not to be too easily satisfied with the carbureter's performance, as it may be found that one fault such as the above has been imperfectly offset by another fault in the other direction instead of the correct adjustment being made where the fault really lies. A good carbureter will give a sensibly correct mixture at all speeds within the ordinary range of the engine. If it fails to do this the thing to do is to investigate until the trouble is found.

### CARE OF TIRE PUMP LEATHER

The proper unguent for the cupped leather washer of the tire pump piston is vaseline. Oil is too thin and it tends to work into the rubber hose, and even into the tire itself if too much is used. Vaseline, on the other hand, clings to the leather and lasts a considerable time. If the leather becomes dry it does not hold air well and pumping to high pressures becomes impossible, while the labor of pumping even to low pressure is greatly increased.

### KEEPING LENS MIRRORS CLEAN

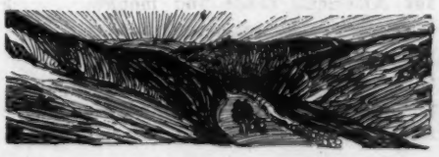
Few owners of cars, even those who drive frequently at night, appreciate the importance of keeping the lens mirrors and front glasses clean. A greasy or dingy surface such as follows one or two evenings' driving absorbs a considerable percentage of the light from the flame. By far the best and handiest thing to clean the lens mirrors is a mixture of equal parts alcohol and water. Denatured alcohol answers the purpose perfectly well. Pure alcohol evaporates so quickly that it leaves the greasy film pretty much as it was, whereas a 50 per cent solution evaporates more slowly and gives time to wipe the glass clean. It would be an excellent idea for every garage to keep a bottle of this solution and some clean rags always on hand. While on the subject of lamps it is worth mentioning that all gas tubing from a generator should slope either downward or away from the generator and there should be provision for draining it at its lowest point, since there is a gradual condensation of water in the piping which, if it collects in pockets, results in objectionable flickering.

### CHANGING SPRAY JET SIZE

Occasionally a carbureter is found to be too large for the engine or to have too large a spray orifice. The advice has been given in such a case to reduce the size of the spray orifice by lightly pening the top of it with a hammer. This is counsel of doubtful value, even if the hole be afterward reamed true, since it is manifest that the burr formed in the top of the orifice cannot possibly be deep enough to be at all regular in its form. It will almost inevitably throw a jet slantwise instead of straight, and this jet failing to strike the main part of the air stream will be only partly atomized, with resulting misfiring and general bad behavior, especially at low speeds. If a new nozzle of smaller size cannot be substituted, the best thing to do in case there is no needle valve to adjust the flow of gasoline to the jet is probably to warm the ingoing air as much as possible, in order to make evaporation by temperature take the place of atomizing due to the air's velocity.

### GREASE FOR TWO-TO-ONE GEARS

If the two-to-one gears of the motor are housed separately from the crankcase, and are oiled by a separate oil pipe, it may be necessary to resort to grease to induce them to run quietly. This may particularly be true if the housing is not oiltight, so that the oil fed to the gears runs out as fast as it goes in. It is comparatively easy to melt up a pint of grease and force it through the oil pipe connection from an oil gun. The grease will solidify on the gears and last a considerable time. If there is a governor attached to the gears, it is necessary to use some discretion, as too stiff a grease would prevent the governor from acting quickly.



### LARGE OIL GUN USEFUL

A handy appliance for the garage and even for the private owner is a large quick-action oil gun, which is easily made from an old bicycle pump by plugging up the outlet and drilling and tapping the bottom plate for a nozzle. The bottom plate can be cut down to the diameter of the pump barrel in case it has an extension to be held by the foot when pumping. Such an oil gun as the above is handy in many ways, as for quick filling of lubricators and scattered oil cups. It is very convenient also for sucking out the oil from the gearcase when a fresh supply is to be put in. This oil is usually too stiff to drain out, and as it is too full of steel chips to be allowed to stay in the gearcase, it must be removed in some manner. Obviously for such use the nozzle of the oil gun should be short and fairly large.

### MISFIRING MAGNETO IGNITION

Misfiring due to sooting of make-and-break igniters is apt to be puzzling to the man accustomed only to high-tension ignition. It is most pronounced when running on low throttle and, instead of being confined to one particular cylinder, it will affect all alike. If the current leakage is slight, the engine may start without much difficulty, but if it is pronounced the engine may refuse to start at all. Testing the cylinders individually by cutting out three at a time will not necessarily locate the trouble, since the cylinders are then taking sufficiently full charges to give regular ignition. If the leakage is confined to one cylinder and is so pronounced as to put that cylinder out of commission it will have a similar effect on all the others, but it can be traced by cutting out one cylinder after another until the faulty one is located, when the other three will fire regularly.

### HANDY PISTON HEAD SCRAPERS

In most engines the piston heads can be scraped clean of carbon without removing the pistons from the cylinders by means of specially formed scrapers introduced through the opening over the valves, or through the spark plug holes when the latter are horizontal. The form and size of scraper will depend on the particular engine, but almost any suitable form may be made from $\frac{1}{16}$-inch steel tubing about 12 inches long having the ends hammered flat and turned over at right angles in a vise. The ends are then filed straight and sharp, and the shank of the scraper may be bent to right or left, if necessary, or left straight. Frequently two scrapers will be needed in order to use both right and left hand bends. The advantage of tubing for this purpose is that no blacksmith work is necessary.

# The Readers' Clearing House

**EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems and invites a discussion of pertinent subjects. Correspondence is solicited from subscribers and others.**

## IMPROVE THE DIFFERENTIAL

Deming, New Mex.—Editor Motor Age—Having read the article on approved road construction by James H. MacDonald in Motor Age, issue of September 17, I would like to suggest, through the Readers' Clearing House, that the remedy for the destruction of road surfaces must be sought not in a better or more lasting material, but in the vehicles themselves. A rubber-shod horse drawing a rubber-tired vehicle is not a very destructive proposition to a reasonably dry road surface, even if a heavy load is carried. A heavy vehicle would simply require a tire of sufficient width. Now, why should a self-propelled vehicle be so destructive? It must be due solely to wasted efforts of the propelling medium and if a high efficiency were obtained, there would be little energy wasted in destroying the road surface. If the drive were from the rear wheels, these wheels should be considered as two pulleys traveling on an endless belt, forming a rolling contact with the road surface, skidding very little when taking a short turn at reasonable speeds. To accomplish this result an ideal car is required, eliminating the evil effects of torque and traction reaction, deflection and distortion of motor, transmission, frame, axles and driving mechanism, together with spring and radius rod action. In the case of shaft-driven cars, the motor must not be accelerated or retarded when either rear wheel raises over an obstruction, or drops into a depression. In the case of chain-driven cars, this is accomplished when the distance between the frame and rear axle is varied. A better type of differential will be required and the irregular torque of the motor should be delivered to the rear wheels as a constant turning effort. This should constitute the ideal car and the solution is so idiotically simple with the exception of the differential, that I cannot see why it was not accomplished in the experimental stage.—G. A. Roland.

## USING OLD CASINGS

Chinook, Mont.—Editor Motor Age—I have worked out a method of using up old casings which have been of considerable value to me and, I believe, would be to others. It is to remove the clincher bead and then put the casing on another as a tread, riveting through both about every 6 inches on each side. I use ordinary copper rivets about ½ inch, with heads shaped as follows: make a mold of a piece of round iron, with the end rounded and a hole drilled for the stem of the rivet, and then putting the rivets in the mold hammer down the heads over the rounded end so as to make them slightly cup-shaped. In this shape they will not injure the tube and are not so likely to pull through. A set of old tires fixed this way lasted me all last winter, and a number of my friends use the same method. One might tnink that a casing would not go over another of the same size, but with a little care and time it is easily done.—C. F. H.

## FAVORS DEMOUNTABLE RIMS

Chicago, Ill.—Editor Motor Age—We always are interested in the Readers' Clearing House columns of Motor Age. In issued of September 24, we noticed an article from James H. Clark, who while apparently having studied the demountable rim matter, seems to think there are no demountable rims which are secure. His idea of demounting the wheel is not new. Several of them are on the market abroad, but are not the successful article as is the demountable rim. The Nadall demountable rim has been tried and found secure. The expanding steel shoe becomes part of the tire rim and something must break before the expanding shoe can give way. A recent trip from Kokomo in a fast Apperson proved how secure was the rim. At a speed varying from 60 to 70 miles an hour a right rear tire was thrown off. To show the force of the impact it must be stated that the tire-cover was pulled out "by the roots," as it were, leaving the lugs within the rim, having pulled the tire out from under the best fastening known to clincher tires; yet the rim remained intact on the wheel. It took about 5 minutes to make the change, and to give one an idea of the speed that was maintained, the time between Kokomo and Chicago, 205 miles, was 8 hours. We believe our principle is the best on the market, and if Mr. Clark will look well into it, we are sure he will agree with us. We make all wheels truer and stronger, and our principle keeps them true. Also, we have no instance of collapse or derangement and we have fitted Goodrich, Marsh, Goodyear, clincher, and other rims with eqral success. Our rim is a universal rim and standard equipment is used entirely, making it possible to take a car off the street, use the rims on it and transform them into Nadalls.—Berne Nadall.

## VALVE-IN-THE-HEAD MOTOR

St. Louis, Mo.—Editor Motor Age—I have noticed for some time discussion in the valued columns of Motor Age, as to the subject of valve-in-the-head motors. All of this seems to be very good as far as it goes and the conclusive evidence apparently is that valve-in-the-head motors are quicker, more powerful, and more efficient than the T type of construction. But the thing that seems odd to me is that such big firms as Fiat, Mercedes, Mors, and, in fact, all the old prominent firms equip their racing cars with valve-in-the-head motors and yet use the T head construction on the cars which they supply their customers. The writer was interested in looking at the statistics of the cars in the grand prix race. Fully 80 per cent of them had valve-in-the-head motors, while the very same cars in their stock forms are of the T construction. Maybe Motor Age could suggest some reason for this apparent motor discrepancy. —W. H. Rozier.

Valve-in-the-head motors are used by the firms you mention in road races because the motors are capable of higher speed, and are quicker acting, and more efficient. It has caused not a little worry why many makers have used this type of motor in racing cars for years, but have refrained from introducing it in their stock machines, the apparent reason being that motors of this type are a little more noisy than the T head style. It also is a fact that it requires more talking to sell a valve-in-the-head motor than one with the T style of cylinder. This is due to the general public having accepted the T head as the most approved type, and in using its lines the maker follows the course of least resistance. We have in America at the present time a dozen or more followers of the valve-in-the-head motor, many of which have been on the market for several years and all of which have given entire satisfaction.

## TAR ELIMINATES DUST

London, Eng.—Editor Motor Age—The problem of motoring at excessive speed has created great excitement in parts of Scotland because of the action of authorities and the attitude of local bodies. The greatest opposition comes from the fact that excessive dust caused by fast traveling robs the roadside hamlets and country of much of its pleasure. Dust is the main cause in fact of this opposition. It is a mistake to say that cars cause the dust, as it undoubtedly existed before cars were known, but the fault lies with the road authorities who have not adapted their roads to meet the demands of modern traffic. Many of the present roads are not suited for motor cars, which call for a dustless, non-slipping surface. In the county of Kent laying a coat of tar on the highway has solved the difficulty. There dust is unknown, and studded or armored tires are not required. There is

no danger from side slips, and it is only on ordinary macadamized roads, which are not intended for carrying the new traffic, that tires of that pattern are necessary. The road surveyor of Kent, who has coated 2,000 miles of road with tar, says that the cost of upkeep is less than when motor cars first started.—S. F. Edge.

### ROAD LAWS TOO SEVERE

Oil City, Pa.—Editor Motor Age—The canal came first, then the steamboat, then the steam railroad; the horse-drawn street car was superseded by the cable car, and it in turn by the electric street car. The jinriksha, or man-drawn cart, was superseded by the ox-team, and it by the horse—and it in turn by the motor car. And so it comes to pass that we today are enabled to cover great distances quickly and are fast becoming one great community. As a natural sequence to the fulfillment of the inexorable law of progress has come to pass the advent of the motor car. The same spirit of antedeluvian ideas that opposed the progress of transportation heretofore today are bitterly opposing the motor car. It is the tendency of men to go to extremes, first too far one way, and then too far the other way, until finally a middle course acceptable to the great majority is reached. The present road laws are the extremes of restriction, unjust and discriminating detrimentally to the motor car. Towns, villages, and cities that pass speed limits of 8 to 10 miles an hour overshoot the mark of reason and sense. If laws were passed limiting the speed of motor cars to 10 miles in congested sections of towns and cities and 15 miles in the free sections, with 20, 25 to 30 miles in the country, they would be reasonable, would be easily adhered to, acceptable to all sane motorists, and work out quicker than any other measure the desired end of safety. Ten miles an hour, except in the most congested business sections, is perfectly ridiculous. Fifteen miles an hour is the happy medium and safe. A mortorist who will drive even out in the open country over 30 miles an hour should not be fined, but sent to jail, because he has gone to the other great extreme. Now, what we are advocating is a reasonable, fair, and happy medium of speed limitations. It is what will come ultimately, and the quicker adopted the quicker all drivers of motor cars will fall in with hearty accord and aid in its mantenance. "In a medium course we go most safely."—One Motorist.

### USES DECARBONIZERS OFTEN

Allentown, Pa.—Editor Motor Age—If my experience with the solution lately put on the market for ridding cylinders of a gas engine of carbon will assist any of your readers, shall gladly give same. When put on the market last spring, I secured ½ gallon and from its continuous use, even during the hot months, am convinced it is a most useful adjunct to the proper running of a motor car. The directions given with the article call only for use as a cleanser at times, but it has been used right along in the cylinder oils in my car, and after any long trip would give the engine an extra cleaning with it, so that my car has not had the least engine trouble as regards over-heating, missing, sooted plugs, etc., since using the decarbonizing solution.

This method was followed: When first applied 1 to 2 ounces were injected into each cylinder after heating up the engine and removing the spark plugs; then the plugs were put back and the engine started, letting it run, say 10 minutes or more, until the heavy black smoke issuing from the exhaust would lessen up, showing that the solution had been used up. Then would remove the plugs again and put in each cylinder one-half gun or so of kerosene, attach plugs again, start the engine, and run as before until all the dirt and carbon were entirely blown out.

I then stopped the engine, opened the pet cocks attached to pipes, one under each cylinder, driven into the engine case, thereby draining the case of few quarts of black, sandy-like, sooty oil, which one readily could see would do no engine any special good. When all of it was removed, then I put back the normal amount necessary for my case, 2 to 3 quarts, with 6 drams, or ¾ ounce of the decarbonizer solution mixed thoroughly into a gallon of the oil. Through the oiler tank to the different parts of the engine fed by this oiler, goes the same mixture of oil and decarbonizer—¾ ounce to the gallon—so that the engine is constantly using the decarbonizer, and the plugs from this car when removed are as white and clean as porcelain can be made.

I first made comparative tests from 10 ounces to the gallon down to ½ ounce to the gallon, and found at ¾ ounce to the gallon the solution which kept my plugs clean. When 10 ounces to the gallon solution were used, engine heated greatly; cut this to 5 ounces, still it heated, but not so much—plugs still white, but less heat; then cut it to 2½ ounces to the gallon, still plugs white, but less heat; then 1 ounce to the gallon, plugs still just as white, but no extra heating noticed at all, even on hot days; then thought I would do better by cutting to ½ ounce to the gallon, when I noticed plugs, when removed, were slightly brownish, so tried ¾ ounce to the gallon solution, which I found the solution necessary for my particular engine. I might add that each time I changed these solutions, the oil case was emptied with the oil gun and case filled with the mixture to be tried next; also the engine case drained and same strength mixture of oil and decarbonizer put back as was being used in the oil case. While wasting some oil from the engine case, the experiments have well repaid me, as I have the first trouble to occur yet from a choking engine.

In mixing the decarbonizer with the oil, better take a gallon at a time to shake it thoroughly and more easily. I have never used it in the gasoline, as I have heard reports of this manner of using, but should think it more economically used in the oil; also get to the place quickest where it is needed—in the combustion chamber. If there would be no splashing in the cylinders from the case, then plain oil would be necessary only in the case.

To satisfy myself that the cylinders were in no way being affected, I had them off 12 months after its use, and the walls of the cylinders, pistons, piston rings, etc., were just as clean as if scraped and polished; the only place where there was carbon was on each baffle plate between base of cylinder and engine case, and this was held there, as it could not properly get out to be blown through. The exhaust valves had very little carbon attached, and the engine power is today just as good as after thorough overhauling.—Palmer J. Kress, M.D.

### CRITICIZES MODERN MOTORING

Franklin, Pa.—Editor Motor Age—Allow me to take up a little space just to remark about fakes. We have all kinds of fakes, gotten up to catch those who rely upon only what they see in the papers. They are led to believe only what is printed and no kind of argument can change them. The first and most dangerous is the car which carries gasoline under pressure and at the more exposed part of the machine, between the rear wheels. In that position it is not possible to guard it against the carelessness of others, or is it possible to sometimes prevent its puncture by stones thrown up by the wheels. I do not care who says otherwise, it is not necessary for any car to carry gasoline under pressure. I have owned motor cars for years, have driven them over the worst and most mountainous parts of the country; in fact, I live in about the hilliest country between the Laurel ridge and the Rockies, and I never have found the hill so steep that I could not feed every bit of gasoline in my tank through the carbureter. Those of the readers of Motor Age who have crossed the Hudson river at Newburg, know how steep is the hill which goes directly from the ferry house to the hotel; on this hill, one Sunday, I used up every drop of gasoline in my tank. I will guarantee to feed all the gasoline in my tank through the

carbureter on any hill used by cars; I do not care if it is Tug of War hill; the long, steep hill just west of Poland Springs or going over Jacob's Ladder. If this is true, then why do makers insist on putting the gasoline tank between the rear wheels and feeding by pressure? It is dangerous and useless. The builder could better use that space between the rear wheels by putting a 5-gallon can in which to carry the extra allowance of lubricating oil. There would not be any danger in that as it is almost impossible to set lubricating oil on fire by applying a match, and when it does burn it does so slowly and does not go off with an explosion as does gasoline when under pressure.

Another fake is the advertised road records made by different cars, accounts of which are given in the reputable press of the country. It is known at the time that these so-called road records are made at the expense of breaking all the road laws of the states through which they are made.

Another fake is the hill-climb fake. It is a certainty that the same power will carry the same load up the same grade at the same speed, providing the gear is the same. In this matter of gear is the whole fake. Why not compel all cars looking for records in hill-climbs to give the gear ratio of the car doing the climbing? One may take a little 20-horsepower car and gear it at say, four-to-one on the high, and it will make a heavy 50-horsepower car, geared two, or two and one-half-to-one on the high and carrying the load it is built to carry—not stripped cars—look like 15 cents. What do intending purchasers care about the performance of a stripped car? They want to know what a car that they intend buying will do on hills and on the level with the load it is intended to carry.

One more fake, and that is the car-weight fake. I never have known a car to weigh as little as claimed by the builder. Just the other day a new car was brought to town which is certainly a beauty, and which the builders claimed weighed 3,200 or 3,300 pounds. It was taken to the scales the day it arrived and the driver owned up that it weighed 3,975, and I am not sure that the tanks were full. The maker of a very high grade car insisted, at the New York show, that his 45-horsepower car weighed less than 3,500 pounds, but the truth is it weighed a little over 4,000 pounds; and so it goes. If the publishers of the papers will not take a hand in the matter of making the dealers in cars stick to the truth, then it must be someone else will have to do it.

These very men who advertise law-breaking runs are the first to take up arms against what is called drastic laws. Who is to blame the law-abiding citizen for doing what he may towards passing laws so strict that they will hold just the law-breakers? There is one thing that will be fought for at the next meeting of the state legislature, and that is giving the highway commission power, or rather making it mandatory on him to revoke the license of any one who uses the highways of the state to determine any kind of a wager or who admits he has driven from place to place at a rate of speed greater than that allowed by law. It also will be asked that a law be passed that in addition to a fine and the revoking of the license that should such person attempt to drive again he shall be given a stiff prison sentence. The dealers have about killed the goose which lays the golden egg by this eternal grasping after speed on the public highway. Motor Age may publish this or not as its interests may direct, but I have had the whole matter in my mind for sometime and as the question will be argued soon, I thought I would let readers of Motor Age in other states know about the way we feel in Pennsylvania.—John Wilson.

### LOZIER'S MONTAUK MISHAP

New York—Editor Motor Age—In the September 24 issue of Motor Age describing the incidents of the Long Island mechanical efficiency run, the statement was made that H. M. Casbrunt's Lozier broke its differential and stripped its gears when attempting to get out of the deep sand between Amagansett and Montauk Point. We know that this was the common report, and Motor Age, therefore, was in a measure justified in accepting the report as true, but as this car did not break its differentials and did not strip its gears, we believe that Motor Age will promptly make this correction. Mr. Casbrunt was an amateur driver and owner of his car, entering it on his own initiative. On the first day's run, after luncheon, he left the control without the authority of the committee and raced to Amagansett at a speed of 50 to 55 miles per hour—in violation of the speed laws and the rules of the run. Unfamiliar with the road, he continued through the sand strip toward Montauk at racing speed, with wheels at times up to the hubs in sand. In the severe strain of these conditions, the spider holding the differential gears was broken—an accident, by the way, which never has occurred before. Not a differential gear or a gear of any kind was damaged, stripped, or broken, and when the spider was replaced Mr. Casbrunt returned under his own power. We have stated upon honor publicly, and repeat the statement, that there never has been a case of a broken or replaced differential or transmission gear, or a broken or worn gear tooth, or one showing sufficient wear to require replacing, and we repeat this statement, and also the statement which we have publicly made that we do not believe that there will ever be a case of a broken gear or gear tooth in a Lozier shaftdrive car.

In view of the above facts, you can understand our wish to have this erroneous statement corrected.—C. A. Emise, Lozier Motor Co.

### WHO MAKES STAR PUMPS?

Kansas City, Mo.—Editor Motor Age—Through the Readers' Clearing House, will Motor Age give us the name of the manufacturer of the Star compressor air pumps? —Kansas City Automobile Supply Co.

Motor Age is not able to give you the address of this concern. Information on this subject from any of the readers of Motor Age will be appreciated.

### CONCERNING TIRE SIZES

Menomonie, Wis.—Editor Motor Age—Please answer the following through the Readers' Clearing House columns: 1—What is the actual diameter or circumference—either—of a 30 by 3 Fisk tire? I had supposed it was 30 inches, which would be 94¼ in circumference, but I had the tire covered with rock crusher covers which would not increase the diameter more than ¾ inch, yet I find my tires measure 94¾ in circumference by 31 7-16 inches in diameter, whereas 30¾ would be 96 6-10 in circumference. 2—If a tire on a wheel carrying a speedometer-odometer should not be fully inflated, would it make a difference in the record of distance or speed? If a wheel is 98¾ inches in circumference when fully inflated—that is the measure of the outside surface of wheel and with the entire surface touching the ground each revolution, whether fully or partially inflated—it would seem as if it must register the same, though I do not believe it does as the wheel is certainly reduced in diameter. How is it explained?—H. E. K.

An actual measurement of a 30 by 3-inch tire made at the Chicago branch of the Fisk company shows the diameter of the casing to be 30⅝ inches, which would give a circumference of 97 inches. Doubtless the casing you possess is a 30 by 3¼, a mongrel size which is made to fit a 30 by 3-inch wheel. The difference exists in an added 3¼-inch diameter on the top of the bead. Tests have shown that there is a difference in the registration of speed or distance if a tire is slightly deflated, but it is said to be so slight as not to be appreciable. An explanation of this is found in the fact that when the tire is only partially inflated it reduces the actual outside diameter by increasing the cross sectional diameter; in other words, it is wider sideways than from the rim to the ground. If a tire is not fully inflated it increases the speed and mileage because the circumference is actually decreased and the

odometer and speedometer are registering the full circumference of the tire. Every time the wheel goes around it registers the amount of the full circumference. When it is deflated the circumference is decreased. Exaggerated, it registers 97 inches when it is really only 96 and a fraction.

### CAMERON EFFICIENCY

Beverly, Mass.—Editor Motor Age—I was particularly interested in reading in your September issue, under the heading "Buick No. 10 Efficiency," the remarkable work of this car in covering 134 miles on 5 gallons of gasoline. I had a performance that is equally meritorious with a Cameron car. I made 65 miles on 1⅞ gallon of gasoline and 1 pint of lubricating oil. This was in competition with other cars. The carbureter employed was a Breeze.—H. W. Dougherty.

### MORE GYMKHANA IDEAS

Rock Island, Ill.—Editor Motor Age—I was reading several weeks ago in Motor Age a set of rules for the Wheaton county fair gymkhana, and while I consider the regulations as containing many unique ideas I think we Rock Islanders have evolved something out of the ordinary for our 2 days of motor car contests to be held in connection with the Rock Island exposition September 28-October 3. Thinking readers of Motor Age might find some ideas worthy of emulation in our rules, I herewith enclose the conditions which will govern some of gymkhana events. They are as follows:

Relay Race for Runabouts—Three contestants, each entering four runabouts and four drivers. Flying start. Three stations, at intervals of 660 feet. Each contestant to have a car at each station. Engines not to be started until arrival of car from preceding station. First car starts without passengers. At each station driver hands switch plug to waiting driver. He starts engine while first driver loads into his car. Race to next station and repeat until three stations are passed, then race to wire. This will be repeated for touring cars, except that each will start with one passenger, transferring passenger and one driver at each relay.

Can Race for Touring Cars—Three contestants. Seven tin cans will be placed around track for each contestant; distances between ranging from 200 to 400 feet. Each car to carry three adult passengers. Standing start, 400 feet from wire. Each driver must stop car and pick up his seven cans, then race to finish.

Set Time Runabout Race—Each car to carry one passenger, or two if car has rumble seat. Flying start. Distance, 1 mile or twice around track. There will be five different rates of speed: 5, 10, 15, 20, 25 miles per hour, each contestant being assigned the speed he is to make.

Lance Contest for Touring Cars—Ten rings of different diameters will be suspended at irregular intervals, each ring having a different value in the score, according to diameter. Each contestant will have an 8-foot lance, which must be held back-handed, and while running on high gear, with foot off clutch pedal and without applying brakes, will attempt to spear each ring from its support.

Station Race—Three contestants and three stations as in Event No. 1. Four passengers to be at each station for each car. Flying start, with four passengers. At each station unload and take on four new passengers, until three stations have been passed, then race to judges' stand.

Red, White and Blue Race for Touring Cars—Three contestants, each with touring car and four passengers. Flying start. Race half way around track—¼ mile—to station, where there will be three sets of uniforms. Contestant and passengers will alight, remove coats and hats, and driver and passengers on inner side of track will put on the red uniform, those in the middle will put on the white and those on the outer side will put on the blue suits, then reload and race to wire.

Obstacle Race—Each contestant to drive car over course with obstacles on either side. Must run on high gear, foot off clutch, pedal, and without applying brakes. Obstacles have value according to position, the narrower they make the course the less the penalty for knocking down or brushing against them. Prizes go to contestants having fewest number of points charged against them.

Economy Race—No limit to number of entries. Any kind or size of machine may be used. Amount of gasoline to be determined by cylinder area. Contestants will adopt their own rate of speed. Each car must carry passengers to its full capacity. Car traveling farthest on quantity of gasoline allowed wins.

Besides the gymkhana we will have a parade and several motor cycle races, so, taken altogether, I think we have a most attractive card for an affair of this sort. —R. G. Snyder.

### MAKE TIRE PATCHES

Malinta, Ohio—Editor Motor Age—Through the Readers' Clearing House will Motor Age give me the address of a concern which manufactures leather suitable for a blow-out patch?—Subscriber.

Tire patches suitable for repair work, of the nature you speak of, are manufactured by the following concerns: Buffalo Rubber Works, Erie, Pa.; Diamond Rubber Co., Akron, O.; Empire Automobile Tire Co., Trenton, N. J.; G. & J. Tire Co., Indianapolis, Ind.; Goodyear Tire & Rubber Co., Akron, O.; Hagstrom Bros. Mfg. Co., Lindsburg, Kan.; Hartford Rubber Works Co., Hartford, Conn.; Inner Shoe Tire Co., Grand Rapids, Mich.; M. & M. Mfg. Co., Akron, O.; Mattson Rubber Co., Lodi, N. J.; Morgan & Wright, Detroit, Mich.; Niagara Rubber Co., Lockport, N. Y.; O'Neill Tire & Protector Co., Akron, O.; Tingley & Co., Rahway, N. J.; Traver Blow-out Patch Co., New York, N. Y.; Trenton Rubber Mfg. Co., Trenton, N. J.

### ONE SET OF PLUGS ENOUGH

Council Bluffs, Ia.—Editor Motor Age—Through the Readers' Clearing House will Motor Age inform us if there is manufactured a magneto which can be attached to one side of the coil and run through same set of spark plugs as the battery which would, of course, be attached to the other side of the switch?—Monarch Mfg. Co.

The Remy Electric Co., Anderson, Ind., and the Wheeler & Schebler Co., Indianapolis, Ind., are two concerns that build magnetos of this character. This arrangement gives a very simple wiring and is a most efficient system.

### OFFSET LIMIT 1⅛-INCH

Carson City, Nev.—Editor Motor Age—Having occasion to make a new crankcase for a St. Louis model 18 car, 30-horsepower, we are considering if it would not pay to offset the crankshaft. If we should do so, what would we gain in power. The piston has a 5-inch stroke and the connecting rod will measure 12 inches from center to center of bearings. Will Motor Age inform us what would be gained by this and how much should we offset the crank?—California-Nevada Electric Power Co.

The limit to which crankshafts may be offset is 1⅛ inch, with which offset there is a considerable reduction in the motor vibration as well as increase in the power.

### RUN THE CHAIN DRY

Col, Neb.—Editor Motor Age—Through the Readers' Clearing House will you inform me which is preferable to run a chain dry or oiled when exposed to the dust. My opinion is that the dry method is the better.—J. E. Fulmer.

The best policy is to run a chain dry if exposed to the dust. This does not mean that you should not lubricate it, but that the lubricant should not be on the outside of the chain where it gathers up all of the dust from the wheel. A chain running exposed should be thoroughly cleaned by washing with kerosene until all of the dirt is removed from the bearings of it. This done, an excellent policy is to boil it in tallow, so that this permeates every part of the chain bearings. This done, a careful oiling is valuable after which the surface of the chain is wiped off entirely clean. Attention of this nature insures the lubricant reaching the place it is required and does not leave it outside where it is of little value.

# MIXED FUELS FOR MOTOR CAR ENGINES

**By Thomas L. White**

**EDITOR'S NOTE—Paper specially prepared for Motor Age by Thomas L. White of New York.**

IN considering the question of mixed fuels, it is well to bear in mind that there is no such thing as an ideal fuel to serve the purpose of a standard. Nor, for the matter of that is it altogether correct to say that any one fuel is intrinsically superior to any other. What is really implied in such a statement, is that for use in the standard motor, which is an instrument designed to burn gasoline, fuels naturally grade themselves in a descending scale at the top of which stands the best gasoline substitute. On such a list crude oil would hardly find a place at all, yet given a motor specially designed for burning it, this fuel can hardly be surpassed. To quote from an address on "Fuels for Automobiles," recently presented by Dr. Fritz Warschauer to the Association of German Chemists at Berlin: "As the burner of a kerosene lamp is formed differently from the burner of an alcohol lamp; as the construction of a gas burner is radically different from that of an acetylene burner; so also the combustion motor must be especially adapted to the peculiar properties of the fuel used." This necessary adaptation may range all the way from the total reconstruction of the motor in its more basic features to a few easily made adjustments in the carbureter, and it may be taken that the tendency of "the vigorous attempts which are being made everywhere to produce a suitable motor car fuel" is to conserve by suitable blending the structural integrity of the motor car motor as we have it today.

Apart from the possibility of an increase in the fuel resources of the world due to some revolutionary discovery, the ingredients in any mixed fuel for motor car use must be confined to the following list, in which, for the purpose of completeness, gasoline is included. See next column.

This last named gas is an endothermic compound, which means that, independently of its energy as a fuel, it is capable of decomposing with the evolution of heat when submitted to the action of great pressure or heat or both.

Such being the chief materials at the service of the blender, what are the principles which determine the nature of the results which we can hope to attain? The broad guide to work by is, of course, that of averages. By it the calorific value of a pound of mixed fuel can be calculated once the calorific values of its constituents and the proportions in which they are present are known. The latent heat of a blend can be figured in the same way, and within limits its behavior in passing under the action of heat from the liquid to the gaseous state. It is when we come to the actual phenomenon of combustion in the motor that the relation of what should happen to what does happen ceases to be entirely a matter of averages, nor is the reason of this divergence difficult to find.

GASOLINE
Average composition, C=84, H=16.
Source, petroleum.
Boiling point, 50° to 150° Cent.
Specific gravity, .680 to .720.
Calorific value, 19,000 B. T. U.
Latent heat, small.

BENZINE.
Average composition, C=92, H=8.
Source, coal tar.
Boiling point, 80° Cent.
Freezing point, 5° Cent.
Specific gravity, .899.
Calorific value, 19,000 B. T. U.
Latent heat, small.

ALCOHOL.
Average composition, C=32, H=8, O=35.
Source, vegetable matter, principally corn, beets, potatoes, sugar cane.
Boiling point, 70° Cent.
Specific gravity, .806.
Calorific value, 12,600 B. T. U.
Latent heat, considerable.

TAR BENZOL.
Average composition, C=92, H=8.
Source a by-product in the manufacture of coke.
Boiling point, 80° to 120° Cent.
Specific gravity, .895.
Calorific value, 19,000 B. T. U.
Latent heat, small.

KEROSENE.
Average composition, C=85, H=15.
Source, petroleum.
Boiling point, 150° to 300° Cent.
Specific gravity, .800 to .825.
Calorific value, 19,000 B. T. U.
Latent heat, considerable.

MOTOR SPIRIT, NAPHTHA, BENZOLINE, BENZINE.
Average composition, C=85, H=15.
Source, petroleum and shale.
Boiling point, 60° to 160° Cent.
Specific gravity, .750.
Calorific value, 19,000 B. T. U.
Latent heat, appreciable.

METHYL ALCOHOL, WOOD SPIRIT, NAPHTHA.
Average composition, C=38, H=12, O=50.
Source, the distillation of wood.
Boiling point, 66° Cent.
Specific gravity, .812.
Calorific value, 9,600 B. T. U.
Latent heat, appreciable.

ACETYLENE, ETHENE
Average composition, C=92, H=8.
Calorific value, 25,000 B. T. U.

The useful work which can be extracted from a given fuel by a heat engine does not merely depend on the calorific energy of that fuel, that is, on the gross number of heat units which are liberated by the combusion of a pound of it, but also on the manner of their liberation. Thus, to take one point of importance which enters into the question of the efficiency of a motor, it makes a great deal of difference whether combusion is complete during the early part of the power stroke or is continuous during the whole expansion. Consequently, when we are considering the combustion of a given fuel in a given motor, the consumption per horsepower hour depends on two factors, one of which may be described as quantitative, and the other as functional. When two fuels are blended to make a third it is the functional quality of the mixture which evades the rule of averages. To cite an extreme illustration, although water would generally be regarded as the antithesis of a fuel, having no calorific value whatever, the addition of a small percentage to pure alcohol actually increases its thermal efficiency in the motor. And generally, when a blend is made of two fuels the effect of each on the manner in which the other liberates its energy is a factor in thermal efficiency which cannot be calculated and which must therefore be determined empirically. This does not pretend to say that there is no room for intelligent anticipation, but simply that exact deduction is not possible.

It is a common idea that the maximum power of a motor can be increased by the addition to the fuel used of another of a higher calorific value. This belief is not borne out by facts. It is a matter of calculation, which can easily be verified, that the percentage increase in the calorific value of the blend due to the added ingredient is almost exactly in the inverse proportion of the percentage decrease of the weight of the blend which can be consumed in one stroke of the motor. Or, to put the matter another way, it appears to be a fact for all known fuels, and therefore for mixtures as well, that the calorific value of a given fuel and the amount of air necessary to burn 1 pound of it have a ratio which for practical purposes may be regarded as constant. There is no allowance made in this statement for variation in thermal efficiency or for any endothermic energy which may be liberated in the motor. In the light of the fact that the specific power of a motor is thus virtually constant, it is curious to find Dr. Warschauer stating, "The addition of benzol materially increases both the inflammability and the calorific value of alcohol. The motor output, therefore, increases, while the fuel consumption is reduced." If the output is larger, as stated, the increase is solely due to the functional effect of the admixture, and certainly not to the increase in calorific value.

There seems to be a general consensus that the coming fuel for the motor car will be a blend with an alcoholic base. Straight alcohol, which owing to the unlimited quantities in which it can be produced and the tendency of the price to become lower and lower as the demand for it increases, would be the ideal substitute for gasoline were it not for the fact that for a number of reasons it is unsuited for use in the high speed low compression motor. There is no necessity here to enumerate these reasons. It is sufficient to say that in France and in Germany,

where the alcohol situation is much further developed than with us, the problem of using alcohol in the gasoline motor has reduced itself to the problem of finding a fuel with which it can be satisfactorily blended.

The principal shortcomings of alcohol which it is sought to remedy by blending are its comparatively low calorific value and the tardiness with which a mixture of alcohol vapor and air takes fire. A more vigorous ignition and a speedier inflammation are essential if the basic principle of motor car practice of seeking power in the direction of a high revolution per minute rate is to be conserved. The heavy, slow-running motor with a high compression and a large cylinder volume is the only alternative, and while possibly admissible for certain forms of commercial vehicle, it is too heavy and too bulky to be suited as a power plant for the motor car.

While it may be said that the admixture of any volatile hydrocarbon of the olefiand or aramatic series with alcohol distinctly improves its quality as a fuel, the ingredient which has found most favor up to the present is benzol. Under the name of Motorine, over 2,000,000 gallons of a mixture consisting of equal parts of benzol and alcohol have been used to date by the Paris motor buses. It is, however, important to point out that the motors of these vehicles are specially designed to burn this blend, and their satisfactory operation cannot be taken as a proof that an alcohol-benzol mixture is a true gasoline substitute in the ordinary motor. As Dr. Ferhmann, the expert of the German government, puts it, "It has been proposed to mix alcohol with other fuels of high calorific value, as, for instance, benzol or ergin, and thus to increase its heating value and above all its inflammability. With slow motors good results have been obtained in this manner, but with high speed motors new difficulties arose as a result of the impossibility of completely burning these mixtures, so that there was a great deposit of soot in consequence of the admixture." Alcohol benzol blends have the further disadvantages that the cleanly character of the natural alcohol is entirely lost, and that the exhaust from their combustion is the reverse of odorless. Also from an economic point of view, the sources from which benzol can be procured are not sufficiently extensive or elastic to allow of production on a scale which would be called for to meet a worldwide demand for alcohol-benzol mixtures. We should have the old story of demand and prices rising together.

In the address by Dr. Warschauer, from which quotation has already been made, the conclusion is arrived at that the best admixture to make alcohol more inflammable is acetylene. He says: "Probably the only admixture which is free from these disadvantages is gaseous acetylene. The admixture of alcohol with acetylene has been proposed by several others besides Dr. Roth. Thus, the Americans, White and Barker, bring a spray of diluted alcohol in contact with calcium carbide, thus forming an explosive vapor known as alkoethene. This fuel is therefore a mixture of alcohol vapor, air and acetylene gas. This process, which, besides in America, caused considerable discussion in France, is, however, probably not very practical, for the reason that the acetylene is generated from the carbide directly on the vehicle. Aside from the great weight from carrying along the carbide, this process involves the further objection that the acetylene is generated irregularly especially on account of the vibration on the road." As one of the inventors responsible for this process, it will not perhaps be considered out of place for the writer to take the opportunity here of making a brief rejoinder to Dr. Warschauer's objections.

It may be mentioned that in dealing with the various ingredients which may be added to alcohol, Dr. Warschauer classes acetylene with picric acid, and in the opinion of the writer this association is a very happy one, inasmuch as it touches the real root of the usefulness of acetylene as a corrective for alcohol. Acetylene is not only a fuel in the accepted sense of the term. It is also an explosive. It follows that what we have called the functional action is in the case of its admixture very marked. The trouble with alcohol is its all-around slowness. In a fast-running motor it continues to burn during the entire expansion stroke, and some of it leaves the motor without being burned at all. Now, when a mixture of air, alcohol vapor, and a sufficient proportion of acetylene, which need not be considerable, is compressed and a spark passed, the instantaneous rise of pressure in the vicinity of the spark plug compresses the adjacent layers of gas beyond the ignition pressure of the acetylene molecules and spontaneous ignition results. There is thus passed throughout the mixture an energetic explosion wave which travels from the spark outwards, the acetylene being progressively detonated owing to its unstable character, the alcohol in which it is suspended being ignited at the same time. Under such circumstances the progress of the flame cap is not by direct inflammation from molecule to molecule of the mixture, but by the adiabatic compression of successive zones of the mixture to the pre-ignition point. Now, even on the supposition, which is of course purely imaginary, that the acetylene has no fuel value, its constitutent atoms remaining unburned after the liberation of its endothermic energy, the benefit to the combustion of the alcohol would still remain, for the two disiderata of a vigorous ignition and a speedy inflammation would still be realized. If it be further borne in mind that the efficiency with which a fuel can be burned in a given motor is, to take Dugald Clerk's figure, cut in two if it is burned throughout the stroke instead of at the beginning of the stroke, it will readily be seen that the gain due to the presence of acetylene in an alcohol-air mixture is largely independent of quantitative consideration. The answer, therefore, to the first objection of Dr. Warschauer is that since it is the functional action of the acetylene which is of most consequence, no very great quantity of it is required to accelerate the alcohol sufficiently, and that consequently the weight of carbide which must be carried along to generate the necessary acetylene is by no means the heavy burden which he supposes, being on the most generous estimate well under 20 per cent of the weight of the alcohol in the fuel tank.

As to the second criticism, it should be mentioned that in making alkoethene, the air in the charge is preheated by the exhaust before passing through the carbureter and the carbide chamber. The surfaces of the carbide are therefore always dry and the net effect of the shaking is to preserve a clean carbide surface. There results not a variable but a uniform generation of acetylene. If there were no agitation and consequently an accumulation of ash preventing the access of the vaporized dilute alcohol to the carbide with which it reacts, then an unequal flow of gas could reasonably be expected. The practice in acetylene generators of the type where the water is dropped on the carbide, of mechanically shaking the grate on which the carbide rests, may also be mentioned.

Putting aside now all matters of controversional detail, it is difficult to see how the claim of acetylene as the natural corrective of the faults of alcohol can be put aside. Acetylene has the same percentage composition as benzol, and like that compound exerts a reducing action on any acetic acid which may be formed by the combustion of the alcohol. It has the advantage over benzol that it is cleanly; that it can be completely burned in the motor, and that it produces an odorless exhaust.

Lastly, as a commercial proposition, acetylene means carbide, and since limestone and coke, the raw materials from which carbide is manufactured, can be procured in unlimited quantities, the tendency with acetylene, as with alcohol, will be to become cheaper and cheaper as the demand for it increases. Of no other ingredient with which it has been proposed to mix alcohol can the same be said. Even if their technical merits were greater, they would prove but a stopgap, and by their use the problem of finding a gasoline substitute would not be solved but merely shelved for a while. That this problem is a pressing one may be surmised from the fact that there is a standing offer by the French government of $10,000 to the discoverer of a suitable and satisfactory fuel for use in the existing motor.

# From the Four Winds

N S E W

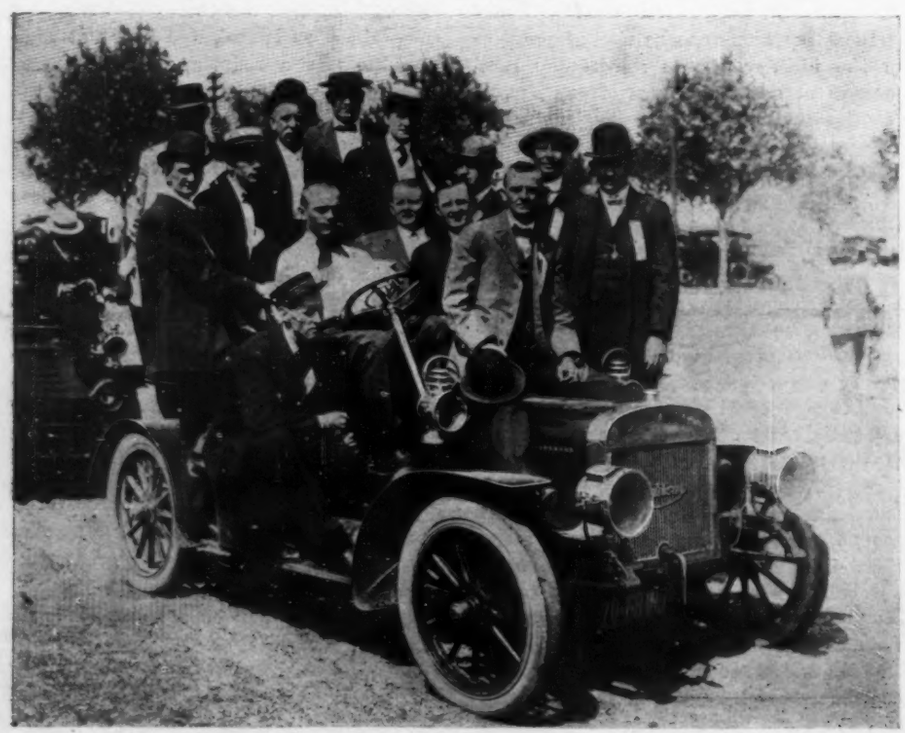
**Robinson Convalescing**—Peter Robinson, who was injured while driving a Stevens-Duryea car in the Springfield hill-climb, is now on the way to recovery. For the first week he did not sleep at all and was continually raving about the accident. Now he is resting quietly and expects to be up and about in another month although he will be on crutches for quite a while because of his broken leg.

**Plans New Score Board**—M. R. Hutchinson, inventor of the Klaxon horn, is at work on a score board for use at the next 24-hour race in New York city. The new board is intended to show to the public not only the mileage by hours, but the mileage made by each car during every minute of the race. The numbers will be 12 inches long and 8 inches wide and can be readily read from Mr. Hutchinson's office in the Metropolitan Life building to Broadway, a distance of two city blocks.

**Coast Record Broken**—Records for the round trip of 335 miles between Los Angeles, Cal., and San Diego, were broken September 23, when L. D. Harvey of the San Francisco branch of Thomas B. Jeffery & Co., drove a 1908 Rambler roadster, model 34-A, over the mountainous route, finishing in 11 hours and 22 minutes, thus lowering the record 1 hour and 6 minutes. Three months ago Harvey with the same car broke the record between San Francisco and San Luis Obispo, at the same time making an effort to cut down the time between San Francisco and Los Angeles. At San Luis Obispo, when the Rambler had a good lead on the record time, the car was held up by the authorities for speeding.

**Brighton Beach Entries**—Entries are already assured for the Brighton Beach 24-hour race on October 2 and 3, are as follows: Garford, Isotta, Simplex, two Loziers, Stearns, Renault, Fiat, two Thomases, A.-K., Acme, Pullman, and Cleveland, while for the short races preceding the 24-hour contest the Mercedes, Isotta and Fiat will be prominent among the foreigners, while the Simplex, Stearns, Thomas, Moon and A.-K. will represent America in the contests.

**Long Trip in American**—A trip covering 2,500 miles between Indianapolis and Boston, and return by a different route has just been completed. The car was the 1909 model of the American roadster, fitted with 40-inch wheels and called the Traveler. The trip was taken under actual touring conditions, the car carrying four passengers, baggage, extra tires and complete road equipment. V. A. Longaker, president of the American Motor Car Co., and Fred I. Tone, the American designer, took turns driving the Traveler east to Boston, whence Mr. Longaker returned at once to Indianapolis. The route east from Indianapolis led through Cincinnati, Columbus, Zanesville, Wheeling, Pittsburg, Johnstown, Gettysburg, York, Lancaster, Philadelphia, Atlantic City, New York, Bridgeport and Springfield to Boston. Returning Mr. Tone drove the car through Springfield, Albany, Syracuse, Rochester, Buffalo, Cleveland, Toledo and Fort Wayne. The trip was begun Friday, August 30, and ended at the factory Thursday, September 17.



FOURTEEN HOOSIER POLITICIANS TAKE RIDE IN CARTERCAR

**Money for Roads**—Sixteen new county pikes will be constructed by the commissioners at Marysville, Ohio, in the near future. To furnish a fund for the work bonds amounting to $75,000 were sold to Weil, Roth & Co., of Cincinnati, at its bid of $3,422 premium. Much interest is being manifested in road work in that section of Ohio, where the new law is being tried out thoroughly and with much apparent satisfaction.

**Wisconsin's Strength**—James A. Frear, secretary of state of Wisconsin, has issued registration certificates for 5,935 cars this year. Of this number about 2,750 are owned in Milwaukee. The number of certificates issued, however, does not indicate the true number of cars in active service every day of the year, as garages in some cases have ten to twenty cars registered under the same number. It is estimated that there are 7,500 cars in Wisconsin at this time. The number 5,935 is an increase of 30 per cent over the previous year.

**Big Load in Cartercar**—One of the best illustrations of the important part the motor car is taking in national politics, was given recently in Indianapolis when a friction-driven Cartercar was loaded with fourteen Hoosier politicians. This load was taken on at the Dennison hotel, Indianapolis, and driven to the fair grounds, a distance of 6 miles. C. S. Hicks, of the Indianapolis Auto Co., agent for the Cartercar in Indiana, was at the wheel. The occasion was the notification of J. W. Kern of his nomination by the Democratic party as candidate for vice-president of the United States.

**Dodge the Assessor**—Only 530 motor cars, with a total valuation of $266,916, were found by Milwaukee assessors in their annual search. Another search brought forth that there were 666 cars. W. F. Hooker, tax commissioner, says that there are too many tax dodgers among owners, and believes the assessors should have found at least 2,500 assessable machines. Any evasions, however, were unintentional, say members of the Milwaukee Automobile Club, as the assessment laws exempt certain cars. It is thus impossible to ascertain the exact number of cars in any city in the state. Then, too, many Milwaukee owners claim ownership in other cities, where they maintain summer homes, which of course prevents their assessment in Milwaukee.

# News from the Motor Clubs

**Mercedes in A. C. A. Event**—Announcement is made by the Automoble Club of America of the completion of the Mercedes entries through the Kaiser-licher Automobile Club. The Mercedes, two of which have been entered, will be driven by Salzer and Poege.

**Another Savannah Entry**—The third American entry for the grand prize race at Savannah has been announced by the Automobile Club of America. It will consist of the latest product of the American Locomotive Co., which embodies a six-cylinder motor of 4¾-inch bore and 5½-inch stroke. The car is entered and will be driven in the race by L. J. Bergdoll of Philadelphia. The Locomotive car will be equipped with regular stock motor.

**Benefits for Bisons**—As a result of negotiations conducted by the Automobile Club of Buffalo with S. W. McMichael, chief inspector of Canadian customs, members of the club are now permitted to go into Canada without putting up a bond. All that is necessary is to present a 1908 membership card, which will permit a stay of 3 days in the dominion. Of course it will be necessary for each Buffalo motorist to take out the Ontario motor vehicle license but in doing away with the bond, the club is saving each of its members from $3.50 to $5 a year.

**Helping the Tourists**—The Rhode Island A. C. has arranged a plan to aid motorists in its state who wish to tour through Massachusetts and have not a license. It has arranged with the Massachusetts highway commission to send one of the examiners to the Rhode Island club when ten or a dozen motorists wish to take the Bay state examination and in this way it helps out much. The examiner has gladly visited the club and as non-members as well as members may avail themselves of the privilege there is no drawback to touring the fine roads of Massachusetts.

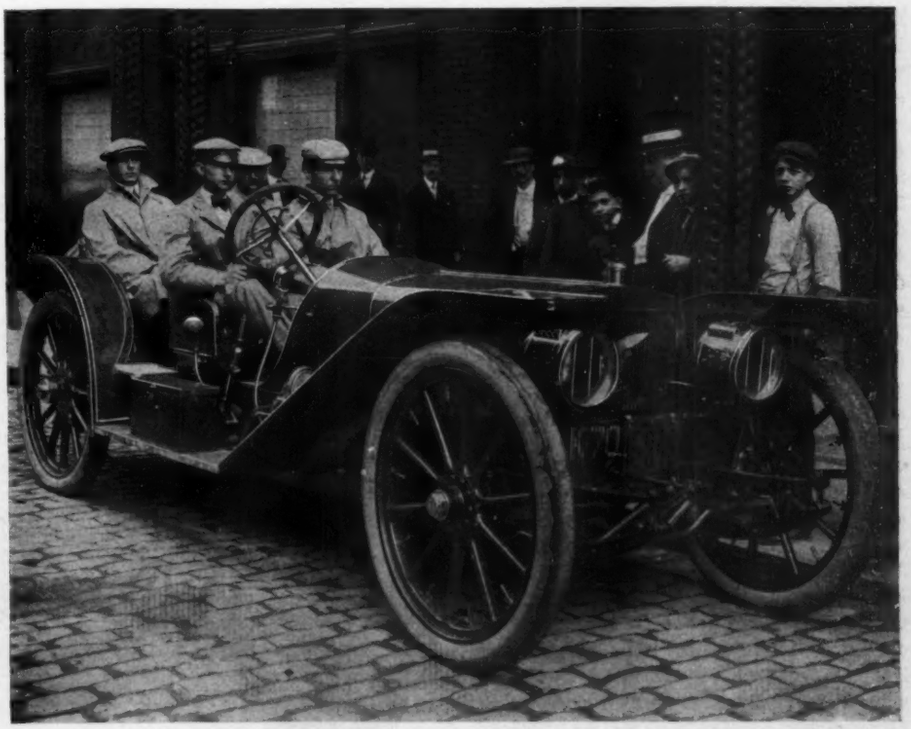
**Looking Ahead**—Preliminary examination has been made by members of the tours and contests committee of the Automobile Club of Minneapolis, of the roads between Minneapolis and Duluth, with an idea of holding the reliability run for the trophy put up by the Minneapolis Tribune over this route next summer. The run, if held to Duluth and back, would be in the neighborhood of 185 miles each way. About 100 miles of the road is what could be called good and the remainder includes sand, some corduroy, some clay and several hills which would prove interesting. On leaving Duluth on the run down there is a hill covering practically 7 miles which would call for experienced driving and willing engines. While no action has been taken on the matter as yet, still a great many motorists favor the Minneapolis-Duluth run and it looks as if favorable action would be taken when the matter is brought up before the club at its next monthly meeting.

**Rambler Club Growing**—Five hundred additional members will be admitted in 1909 to membership in the Rambler Fifteen-Thousand Mile Club, an exclusive organization of Rambler owners who have driven one Rambler car 15,000 miles or more. Some time ago it was announced that the membership in this organization would close when 250 members had been enrolled. Immediately protests were made by owners who had recently covered the required mileage and these protests were so many and so urgent that the company decided to throw open the list indefinitely. Dozens of new members are now qualifying every week.

**Has a New Scheme**—Mayor W. A. Anderson of La Crosse, Wis., member of the La Cross Automobile Club, is helping the club in its efforts to squelch the speeder and place the club and the motorist in the light of a benefactor of the human race rather than a bane to civilization. Mayor Anderson has a system whereby each speeder is brought before him, examined in true Scotland Yard style, lectured, and sent away to sin no more. It works every time, he says, and the result is that there is a decided reversal of feeling against the motor car in La Crosse. Mayor Anderson's example is to be followed by other city executives, and he will explain his system before the annual convention of the Wisconsin League of Municipalities.

**Madison Enthused**—The owners and agents at Madison, Wis., have formed the Madison Automobile League, and its first effort will be to make motor car day at the Dane county fair something to be talked of for time to come. W. E. Petrie is president; Dr. Frank Smith, vice president; A. E. Austin, secretary; M. H. Conklin, treasurer. Judge A. Z. Zimmerman, George Raymer and Frank D. Winkley form the most important committee, the duties of which are to maintain supervision of motor privileges on the beautiful drives built around and among the famous Four Lakes by the Madison Park and Pleasure Association.

**Enjoying Country Home**—The members of the Minneapolis Automobile Club are enjoying the privileges to the fullest extent of their new clubhouse at Bloomington, about 16 miles from the city. Excellent meals are served on the broad porches overlooking the Minnesota bottoms and numerous motoring and dinner parties are given there each week. There are sleeping rooms, shower baths and other conveniences in case storms or break-downs necessitate all-night stays and the club members are all enthusiastic about the farsightedness of the club officials in planning such an ideal spot for the house.



American Traveler That Made Long Indianapolis-Boston Trip

# In Motor Car Development

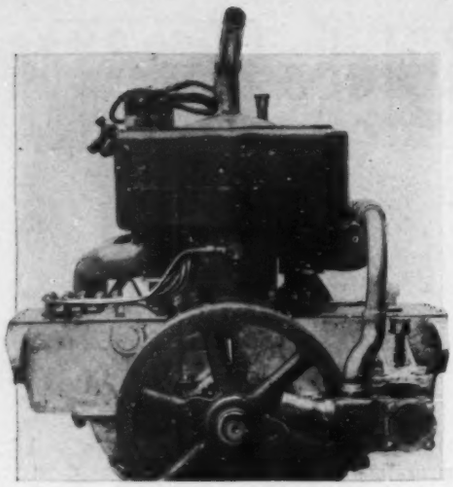


FIG. 1—HAYNES ENGINE

THREE improvements stand out clearly in the 1909 model X Haynes, built by the Haynes Automobile Co., Kokomo, Ind. First comes the employment of a double race of Timken roller bearings at the front end of the crankcase for carrying the crankshaft, and a similar equipment for the crankshaft at the rear end, while Parsons' white bronze is used for the center bearings. Heretofore, roller bearings have been employed at these two points, but never before has the Timken been made use of. As far as Motor Age is aware, this marks the entry of the Timken bearing in this important part of motor construction. As a close follower of this change is the employment of two sets of external brakes acting through equalizers on the rear wheel drums. Each wheel carries a drum 14-inches in diameter and of sufficient width to accommodate the foot brakes, which are raybestos-lined bands 1¼-inch wide and similarly lined lever-applied emergency brake bands made 1½ inch wide. The brake drum is hollow, and a quantity of water can be carried in it to serve for additional cooling purposes when required. Change No. 3 is confined to the Haynes system of relieving the rear axle of the driving torque. On the axle housing to the right of the differentials is a blank pinion A, Fig. 2, 4 inches in diameter, located between the downwardly extending arms B of an inverted U forging, this forging being held in place by transverse tubes C which, at their ends, attach to the side members of the frame. The employment of this torsion system, in preference to the rod paralleling the propeller shaft or the adoption of radius rods from the ends of the axle housing and coupling with the side members of the body frame, is a matter of history with the Haynes company. Their torsion scheme is designed to react against the tendency to roll the rear axle housing backwards, Motor Age readers being aware of the fact that in any live-axle construction this tendency always exists. By the use of the 4-inch blank pinion, the guides which it works between are sufficiently wide apart—greater than the external radius of the axle housing—so that with extreme spring action these guides span the axle without interfering with the torsion scheme.

In model X, which is the only model to be marketed by this pioneer motor car manufacturer, many of the principles used by this concern for years are retained. The employment of two flywheels, one at the front, the other at the rear end of the crankshaft, a policy used for the first time this year, is continued. The forward flywheel D, Fig. 3, weighs 50 pounds, the rear one E, 100 pounds. The only use made of the forward one, besides the additional balance given the crankshaft, which is the ostensible reason for using it, is that the broad belt driving the fan runs on the periphery of this wheel. The wheel is not designed for additional air purposes; whereas, the rear flywheel, with its fan-blade spokes, assists the regular fan in rear of the radiator. This is the first example of an American firm using the double flywheel system, although it has been talked of by one or two others. This construction places the company in a unique position, comparable with that held by the Motobloc company in France, which employs but a single flywheel, locating it on the center of the crankshaft between the front and rear cylinder pairs.

The neat oiler construction, employed in the present model W car, is utilized. In brief, this is a five-feed McCord oiler carried in the front right arm of the crankcase, with the pumps gear-driven from the intake camshaft. This pump has a goodly oil supply in its own reservoir, which, however, is more than doubled by incorporating in the left front motor arm an oil reservoir, and establishing connection with this and the pump by a duct drilled

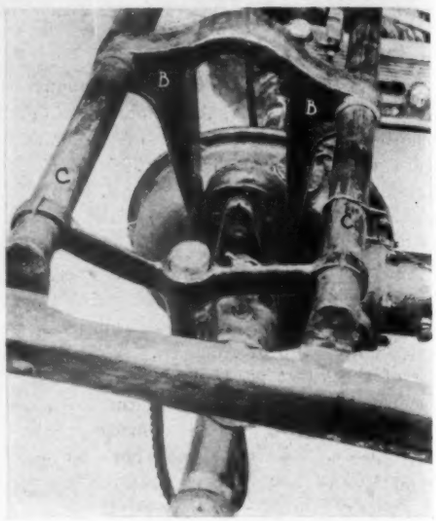



FIG. 2—HAYNES TORSION SYSTEM

through the forward end of the crankcase. The five oil leads connect direct with the four cylinders and the crankcase. Among other cars to employ this method of oiler support is the Stearns, which construction appeared for the first time this year.

Among the many other retained Haynes features, which will be referred to in detail later, are double ignition, frame reinforced with wood throughout its length, contracting band clutch, ratchet master gear located on the front end of the countershaft in the transmission, the employment of a pinion with roller teeth on the rear end of the propeller shaft, and the use of a non-divided live-rear-axle shaft, driving one rear wheel and a sleeve embracing this shaft driving the other wheel.

The four-cylinder motor, 36-1-horse-

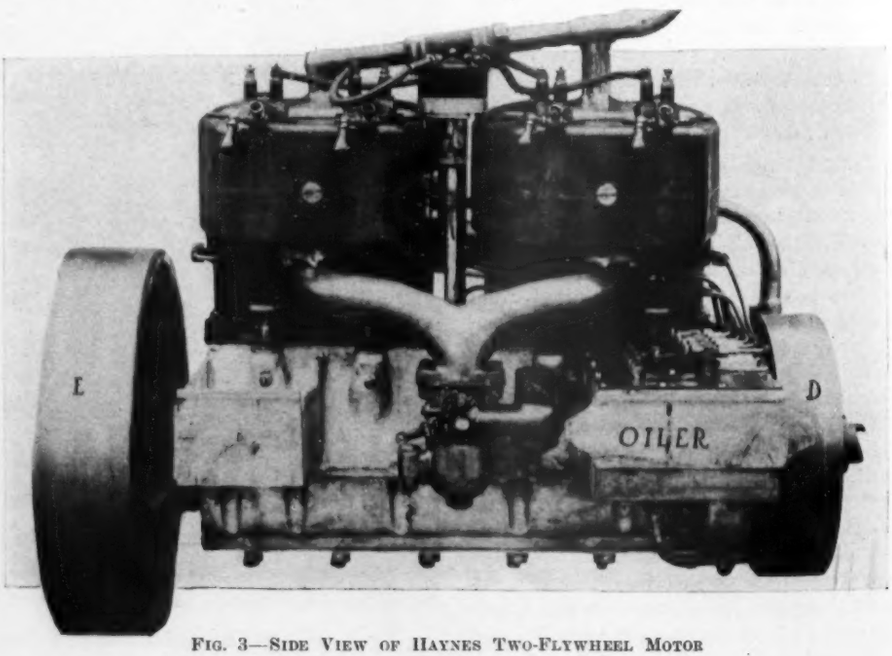



FIG. 3—SIDE VIEW OF HAYNES TWO-FLYWHEEL MOTOR

# One 1909 Haynes Car Model

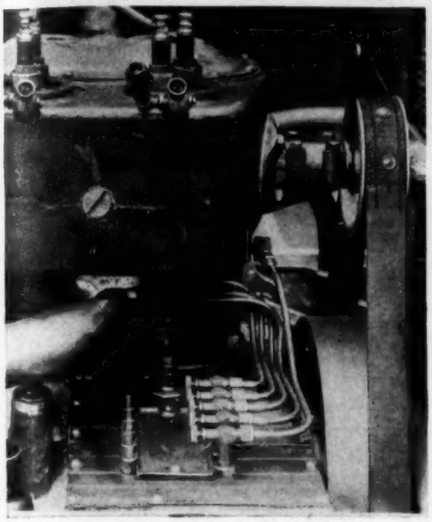


FIG. 4—HAYNES LUBRICATOR

power A. L. A. M., has cylinders with 4¾-inch bore and 5-inch stroke. With the confining of the company's efforts to one size of a car with medium power, the employment of individually-cast cylinders, which the company has used in its big models, comes to an end, for the present at least. Each twin casting is an integral unit with side chambers for intake and exhaust valves, and the jacket heads cut away, making room for the oval aluminum plates forming the jacket heads. The crankcase is a three-part casting; the top part, with which the motor support arms are incorporated, is an aluminum casting which takes the entire suspension of the crankshaft. Beneath it is a box-like compartment open at the bottom, and the bottom part takes the form of a plate with partitions creating an oil well beneath each connecting rod. On the exhaust side is carried the magneto on an attached base, suspended by four bolts from the front and rear supporting arms. This gives it a particularly low location, so low in fact that the top of the magnets is on a level with the base of the cylinders. The driveshaft for the magneto passes beneath the oil reservoir in the front motor arm and, continued forward, carries the pump, located close to the forward flywheel, and supported by a projecting arm on the oil tank. This pump location affords a simple water intake carried directly on the sides of the valve chambers and above the exhaust manifold. Both intake and exhaust manifolds enter the valve chambers at the base instead of at the side. A noted change in the construction part of the motor is the complete housing of the forward motor gears in a separate compartment, which allows them to be packed in heavy oil.

The moving parts of the motor are conventional: The crankshaft is of a vanadium steel piece turned from a solid bar with its bearings ground all over, to which is added a polishing process, with the aim of obtaining as nearly as possible a perfect balance. Interchangeable intake and exhaust valves, made 2⅝ inches in diameter, have nickel steel heads electrically welded to the stems. Connecting rods carry adjustible bronze bearings at the piston ends and white bronze bearings at the lower ends. The employment of compound piston rings continues, each ring being a three-part affair, an inner ring, the entire width of the groove, and two outer rings side by side, with their joints 180 degrees apart and each 90 degrees from the joint in the big ring. The broad inner ring is employed solely for expansive purposes. Three of these rings are employed, and in the plane of the piston pin is a broad single band ring. To facilitate reaching the piston heads without taking them out, the casting head between the combustion space and the water jacket is drilled to take a screw plug which is large enough for perfect access to the piston.

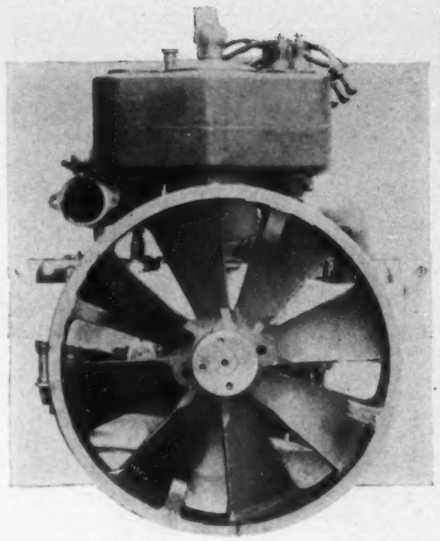


FIG. 5—REAR END HAYNES MOTOR

In the double ignition system, both sets of plugs are carried over the intake valves. The major system is a Bosch high-tension magneto; the minor one, a set of dry cells, a single-unit coil, and a high-tension distributer. The Schebler carbureter is fitted.

Continued use is made of the band clutch and resilient flywheel drive. The bronze clutch drum is supported in the flywheel through four arms forked at their outer ends, which forks span lugs on the inner rim of the flywheel. Between the lugs and the forks on either side are placed coil steel springs. This forms a shock-absorbing action between the motor and transmission. The contracting band is a steel one carried on a diametric arm keyed to the clutch shaft. On one-half of this diametric arm is a radial lever, coupled with the loose end of the clutch band, so that swinging the inner end of the lever tightens the band. In the three-speed and reverse selective gearset, giving direct drive on the third speed, nickel steer gears are used throughout, and standard roller bearings employed for all shafts. The use of the ratchet gear on the forward end of the countershaft permits the car to overrun the motor without disengaging the clutch. This gear consists of a toothed ring on which are pivoted three dogs for engagement with a three-toothed ratchet on the hub. The gearcase support is direct on the side members of the frame. In the propeller shaft are front and rear universal joints, a sliding action coupled with the rear joint. Each joint consists of a pair of jaws at right angles to each other, between which is a hardened steel tube, coupled by the usual center pin. Rear axle driveshaft is one piece from end to

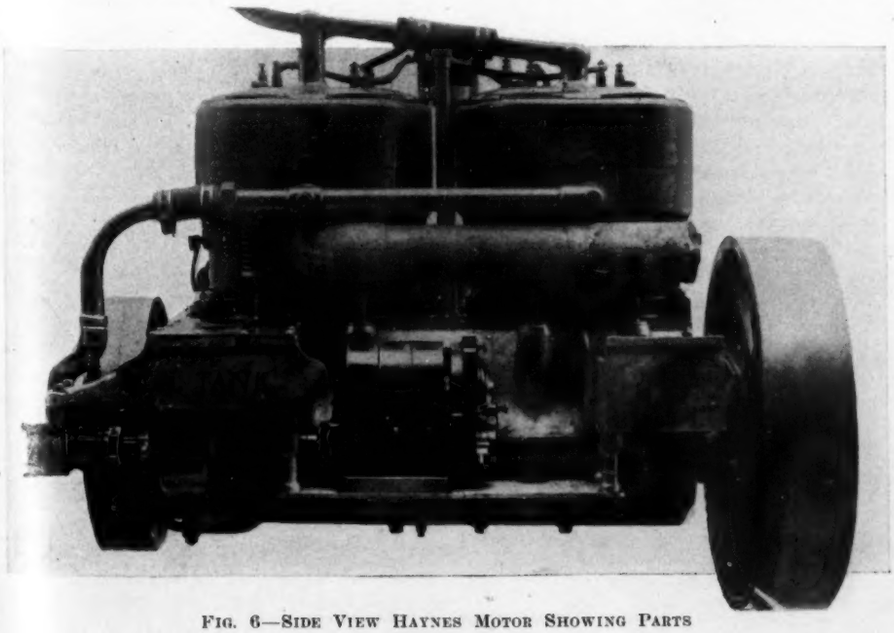


FIG. 6—SIDE VIEW HAYNES MOTOR SHOWING PARTS

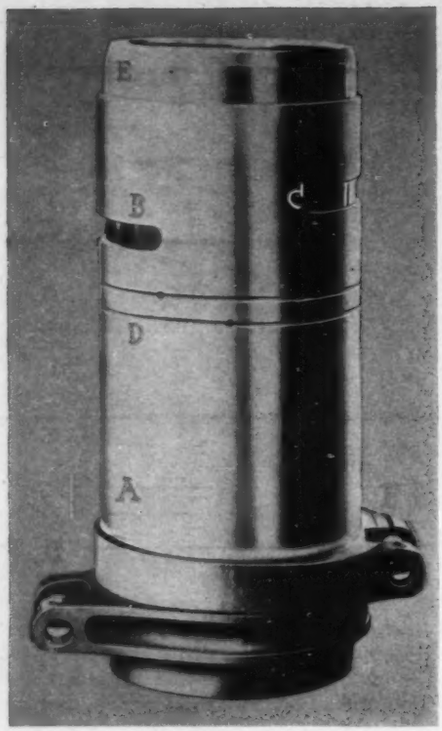



FIG. 1—KNIGHT ENGINE SLEEVES

end, one of the drive wheels being attached to it as well as one-half of the differential. The other half of the differential attaches to a sleeve which couples to the other drive wheel.

In running gear such points are noted as semi-elliptic springs throughout, the rear springs shackled at both ends of the frame; 112-inch wheelbase in all models; 36-inch wheels regularly fitted with 4-inch tires; Briscoe radiator, Timken roller bearings carrying the front wheels, worm and sector ball-bearing steering gear, and a steering rod coupling the gear with the tie-rod arm carried above the front axle. The control centers around the 18-inch steering wheel mounted above which are the spark and throttle control on a stationary sector. In order to avoid confusion with the side levers, the emergency brake when disengaged is to the front and well removed from the change-speed lever. The front axle is a one-piece forging with Elliott ends. The chassis is fitted with five and seven-passenger bodies. In the runabout the seats are 6 inches further back and the dash drawn back and hooded in. The Hiker type resembles the runabout but accommodates two passengers only. A toy tonneau body is also fitted.

In the touring car body, both front and rear seats are made from a single piece of wood which is used because of its lightness and durability. In the upholstering hand-buffed leather and grey curled hair are employed together with the usual springs in the cushion. The front seat is divided and the rear seat made 52 inches wide. There is sufficient room in the tonneau for fitting two auxiliary seats if occasions call for it. In the runabout the seats are of the individual type, are placed particularly low and provision is made for equipping either a single or double rumble seat on the rear, or full size seats such as used for the front. In the hiker body, which accommodates but two passengers, the bucket seats are located particularly low, and are tilted up in front so as to be 1½ inch higher than at the back, which is done to make them easy riding. Directly back of the seat is placed a large circular gasoline tank and on the flat deck in rear of this is room for a tourist's trunk.

### FORD MODEL T

In last week's issue the cylinder diameter of Ford model T was given as 3¼ inches, which should have been 3¾ inches.

## Knight-Daimler Engine

MOTOR AGE last week drew editorial attention to the adoption of the Silent Knight engine, an invention of Charles Y. Knight, Chicago, by the Daimler company, of Coventry, Eng., maker of the Daimler car. On this page is given illustrations of the Knight motor, as adapted to the Daimler cars, its external appearance being quite different from that shown in Motor Age October 26, 1905, which was the first description ever published of this motor. The Daimler company has adopted this on all of its 1909 models, after having spent more than a year testing the motor out and redesigning it to meet the company's requirements. This engine differs from all other gasoline four-cycle ones in that it has not the customary mushroom or poppet intake and exhaust valves, but, instead has between the cylinder walls and pistons two reciprocating sleeves, in the sides of which are openings or ports which control the mixture entering through port openings in the cylinder castings and also regulate the exhaust. In Fig. 1, A shows the external sleeve with openings B and C and oil grooves D, as well as the inner sleeve E, which has openings similar to B and C. These sleeves are reciprocated from a layshaft which connects by short connecting rods with the circular flanges on the bottoms of the sleeves. The regular piston reciprocates within the inner sleeve, and the sleeves are sandwiched between the

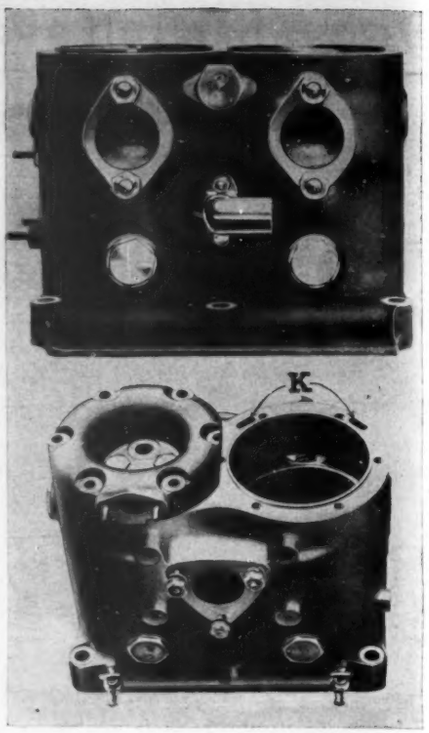
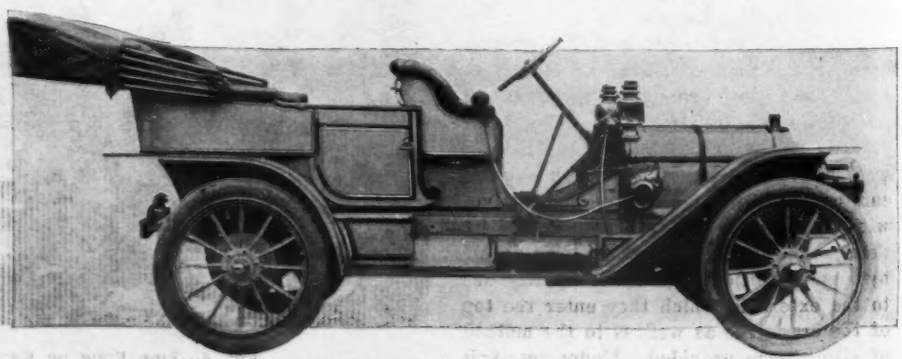



FIG. 2—KNIGHT CYLINDER CASTINGS

piston and cylinder castings. Fig. 2 shows one of the cylinder castings with the head of the one cylinder removed. The cylinder heads are water-jacketed, the circulation from the jackets being through the transfer openings K, seen in the top of the cylinder wall; the water circulation enters the cylinder jackets on one side and exits from the jackets of the heads at the other side. This detached head construction with water-jacketing system resembles in some respects that used in Knox cars, described in Motor Age last week. Fig. 4 shows the magneto which is driven by a cross shaft and spiral gears from the layshaft, which layshaft is driven by Morse silent chain instead of gears from the forward end of the crankshaft.

The operation of the motor is simple. On the suction stroke the two reciprocating sleeves are brought into position so that the valve openings of both coincide and register with that of the intake port through the cylinder wall, as well as with the exhaust ports through the same wall. The intake ports are on one side, the ex-



THE HAYNES MODEL X 1909 MOTOR CAR

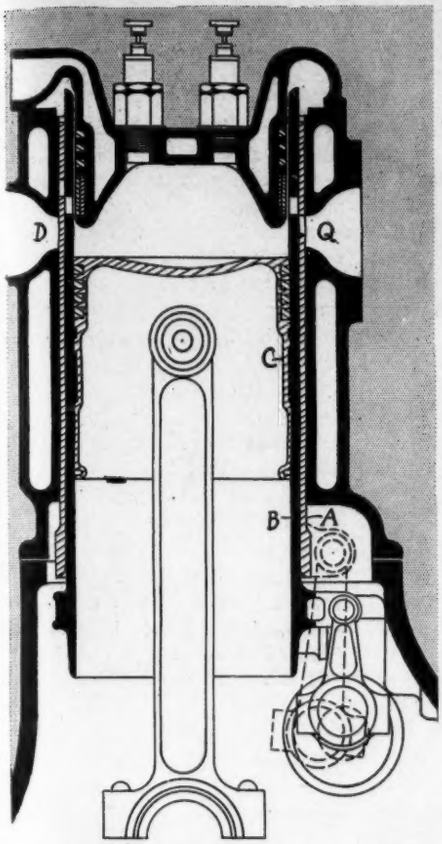



FIG. 3—SECTION OF KNIGHT CYLINDER

haust ports opposite. In his first engine, Designer Knight made use of an auxiliary exhaust port at the base of the cylinder, but this has been eliminated in the Daimler redesigning of the motor. Referring to the vertical end section of the motor, B and A show the inner and outer sleeves and C the regular piston. D is the intake port in the side of the cylinder, and Q the exhaust port opposite. The ports in the sleeves A and B can be seen. On the suction stroke sleeves A and B are brought so that their valve openings register with the intake port D, allowing the mixture to enter on the down stroke of the piston, and, before the bottom of the piston stroke is reached, the sleeves sliding over one another, completely close the port. On the compression stroke, the piston C rises and the timing of the sleeve is such that all ports remain closed. It is to prevent leakage on this stroke that the two sleeves A and B are used. By the time the piston has reached the bottom of the explosion stroke, the port openings of the sleeves begin registering with the exhaust opening Q and the sleeves are timed so that a complete exhaust is accomplished on the upward stroke of the piston. By careful timing, it has been found that as good mixture and as complete an exhaust can be obtained as with regular valves without the wear and vibration caused by them. The sleeves present little trouble by way of lubrication, which is partly due to the extent to which they enter the top of the crankcase as well as to the method of oiling them provided. Under test this motor, which is regularly rated at 38 horsepower, shows as high as 71. It has 4.88-inch bore and 5.11-inch stroke.

In operation the motor is perfectly quiet, the noise of striking and seating valves being entirely done away with. A motor of this type can be operated without excessive vibration at high speeds.

## MOTOR CAR LITERATURE

The American Express Co. has issued for the benefit of its foreign department a small booklet entitled "Auto Tips for Auto Trips in the British Isles, France, Italy and Germany." The booklet contains a list of the company's foreign offices, and much information on the handling of cars taken abroad for a summer tour. It deals with the special shipping arrangements of the American Automobile Association. Directions are given on shipping, driver requirements and custom difficulties.

Under the title, "Laying Out the Glidden Tour," L. M. Bradley, the special representative of the American Motor Car Manufacturers' Association on the Premier pilot, tells of the tour route and illustrates with many reproductions from the camera of N. Lazarnick, the official photographer, the beauties of the country traversed.

"Just a Hint for Good Roads" is a booklet collection of photographs of the New York-Paris cars made while going through the Indiana snows. The book is being distributed by the Chicago Examiner.

The Anderson Forge and Machine Co., in catalog No. 15 on forgings devotes 125 pages filled with nothing but illustrations of the various types of forgings manufactured by it. These include the multitudinous ones employed in motor car construction such as yoke ends, connecting rods, crankshafts, camshaft, gear blanks, steering gear connections, brackets of all types, and in brief, every forging needed. Sizes are given on all of the line drawings.

The Grabowsky Co.'s initial catalog of its commercial vehicles, illustrates profusely every detail of these vehicles, from the accessibility of the transverse motor in front to the most detailed internal construction. The person wishing to obtain a knowledge of these cars can do so very quickly by means of this catalog.

A recent issue of the 1909 Franklin catalog is characterized by a grouping system in the illustrations—two motors, two cars, two engine views being grouped. A novel illustration is a touring car resting on four weighing scales, one beneath each wheel, with a dial on the side of the car pointing to the weight.

The Turner Brass Works has a comprehensive catalog covering its line of supplies for motor cars and motor boats. It is illustrated in the usual supply catalog style.

An interesting aftermath of the Glidden tour comes from the Diamond Rubber Co., which sums up the tire cost for the tour. The data on this occupies two-thirds of each page and on the other third —divided vertically—appear in sepia color on blue ground and within a diamond design photographs of the different Glidden cars which used Diamond tires.

"Cork Inserts," issued by the National Brake and Clutch Co., illustrates on each page how these inserts may be used in the many parts of motor cars from multiple-disk clutches to large pulleys.

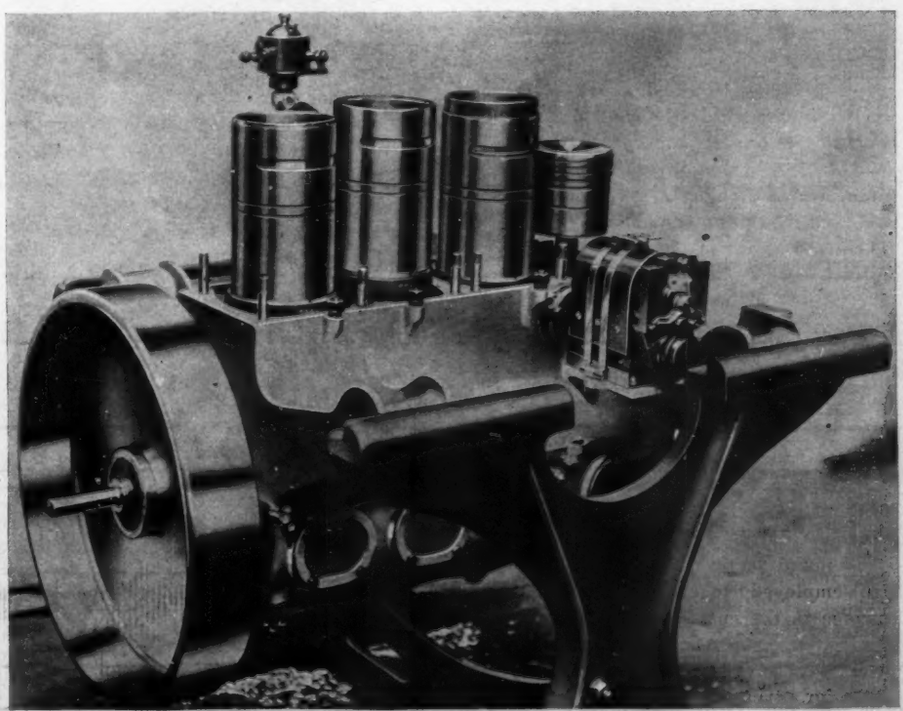
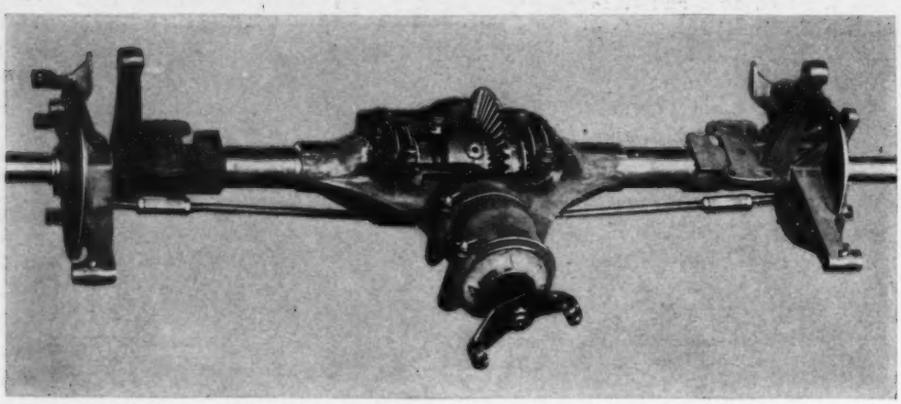


FIG. 4—SIDE VIEW OF KNIGHT MOTOR, SHOWING MAGNETO

# COLUMBIA 1909 MODELS ARE COMPLETED

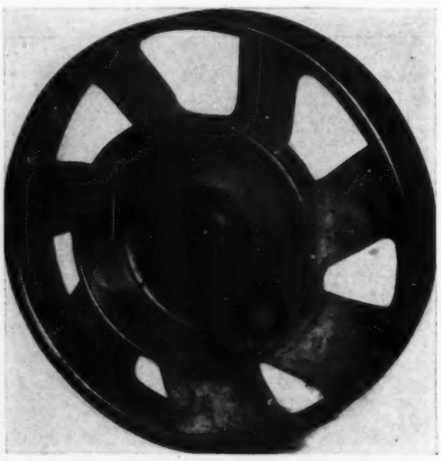


REAR AXLE CONSTRUCTION IN 1909 COLUMBIA CAR

AT the factory of the Electric Vehicle Co., Hartford, Conn., between 500 and 600 men are at work on the company's gasoline and electric cars for the 1909 trade. The leading gasoline model, mark XLVIII-4, 200 of which are being made, is a 30-horsepower gasoline machine with 4¼-inch bore and 4-inch stroke, which, according to A. L. A. M. formula, gives 28.9 horsepower. Deliveries on this will begin October 10. Simultaneous with the production of this model is the manufacturing of a lot of fifty electric victorias. The company also is building a car with a motor with a 5½-inch bore and 5½-inch stroke, which is given a rating of 48 horsepower. This machine carries a four-speed selective gearset, and, like the smaller car, employs shaft drive. It will be manufactured only as ordered. The 30-horsepower gasoline car is a new model in the current sense of the term. It is not merely a duplicate of former models built by this company, but rather a refinement and improvement upon previous models in many respects.

The 30-horsepower motor of the four-cylinder type carries intake and exhaust valves on the left side; the intakes 2¼ inches in diameter affording a 2-inch opening in the clear, and the exhaust 1⅜ inch in diameter with 1⅝-inch opening. The lift is ⅜ inch. A feature of this car is the employment of Hess-Bright bearings for the timing shaft; ball-bearings also are used on the forward ends of the pump and magneto shaft. The chrome nickel steel crankshaft, of home manufacture, is a three-bearing type, carried on specially liberal bearings, the flywheel one measuring 4⅞ inches, and the center and front ones 3½ inches, the journal in all cases having a 1½-inch diameter. An innovation appears in securing the flywheel to the crankshaft flange, due to the flange carrying two dowels and six studs, all of chrome nickel steel, and the studs provided with thimble ends which screw into the flange and rivet into the countersunk recesses. They correspond with holes in the flywheel casting, which are held snug against the flange by six castellated nuts. Use is made of a one-piece camshaft, driven by gears of spiral toothed type with 1-inch face and cut to 10 degree angle.

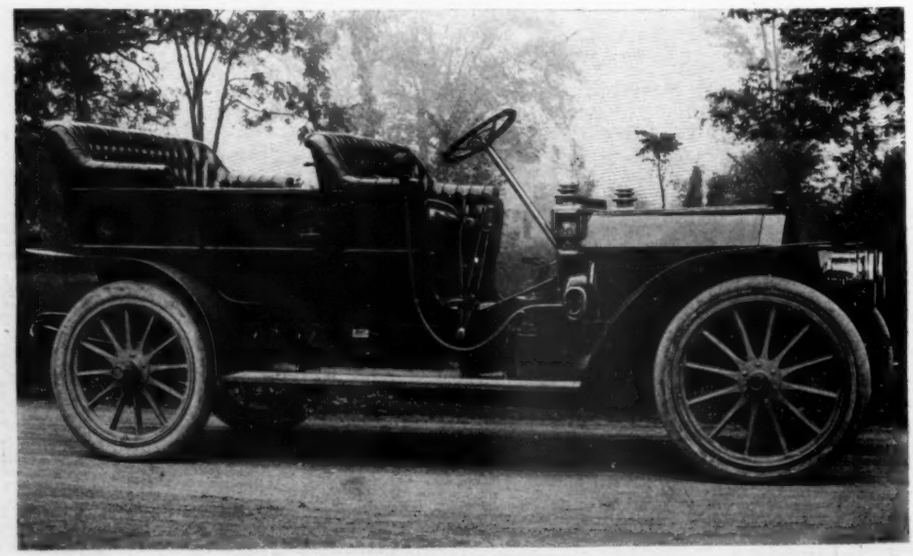
Particular care has been devoted to the design of the motor parts, with the ultimate aim of simplicity and economy apparently always in view. The double jet carbureter has the smaller opening controlled by a governor and designed for speeds as high as 25 miles an hour. This spray jet has additional control through the hand throttle and is suitable for all ordinary running. The large spraying nozzle is entirely independent and controlled by an accelerator. It is used for speeding only.



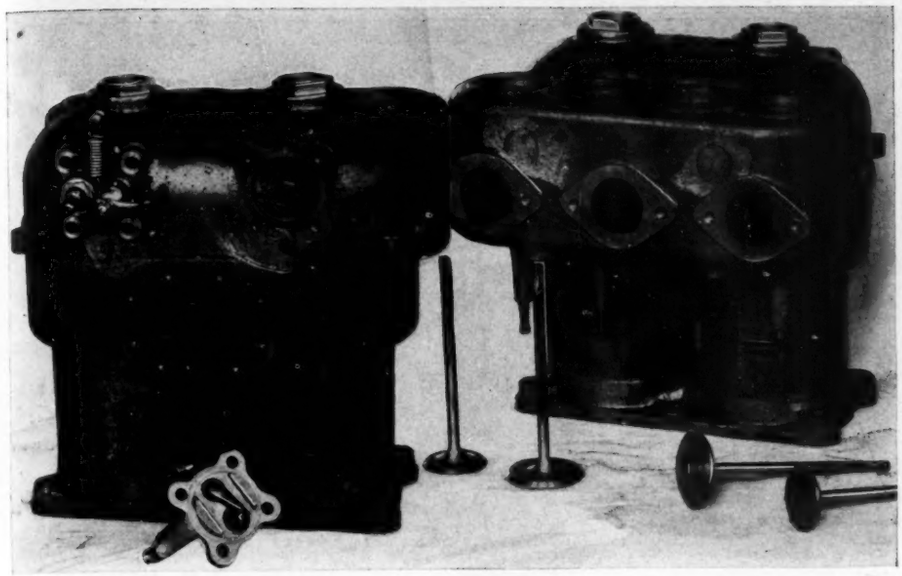
COLUMBIA DOUBLE BRAKE DRUM

The source of lubrication is in a small cylindrical tank hung under the frame from which the lubricant is pumped through a standpipe, the height of the motor, from which it is discharged to all of the bearings before being returned to the tank. On the dash is a 2-inch glass bleeder cup which connects with a short shunt, tapped to the standpipe 2 or 3 inches from its return bend, so that the presence of the oil in the glass is a positive indication of its circulation. The crankcase openings, over which the cylinders rest, are cast with transverse slots through which the connecting rods operate, instead of leaving the entire top of the case beneath the cylinder open. This construction is equivalent to the use of baffle plates and prevents an excess of oil reaching the cylinders. In connection with this the lower ends of the connecting rods carry adjustable scoops to increase the splash. Ignition is by the low-tension make-and-break spark with current taken from a Bosch magneto. The make-and-break parts are carried in a separate piece which fits horizontally into the right side of the combustion chamber opposite the valves, each being secured by four studs.

In the transmission system the leather-faced cone clutch comes first, followed by the three-speed selective gearset with shafts carried on Hess-Bright bearings. In controlling this gearshaft the lever engages with small rocking levers, placed in the sector itself. Shifting the lever laterally engages the rocking levers, by means of a square jaw formed on their upper



SIDE VIEW OF 1909 COLUMBIA CAR WITH LOW-TENSION IGNITION



TWO CYLINDER CASTINGS OF COLUMBIA MOTOR

ends, after which the different speeds are obtained by forward and backward movement. The universal joints between the clutch and gearbox, as well as in the propeller shaft are of the yoke type, turned out in the home factory. The rear axle is a particularly rigid construction, the axle tubes being brazed into the differential housing in the rough. This done, the axle is placed in a hydraulic press and the center pressed down slightly. The lack of alignment so created is corrected by the truss-rod, the turn buckles of which are permanently pinned in place once the axle is straightened. This construction being used in order to set up opposing stresses which tend to maintain a rigidity in the axle. The entire axle is then placed in a lathe and the wheel ends turned, after which it is jigged and bored both ways. The supports are then milled to a level face.

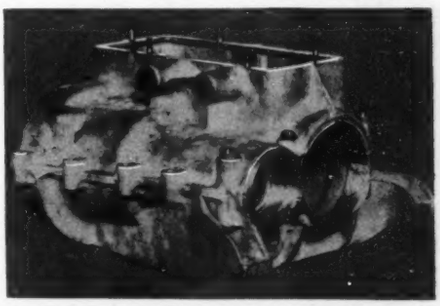
Also noticeable in the rear axle construction is the assembling of the brake drums and rear wheels before boring. These drums are of specially large dimension and have an air space between the internal and external bands in which space are fan-shaped spokes or braces, similar to those employed in a flywheel, and intended to assist in the cooling of the brakes. The front axle is a one-piece nickel steel forging; semi-elliptic springs are employed in front and rear; the wheelbase measures 115 inches, and the 34-inch wheels carry 3½ and 4-inch tires front and rear respectively.

This company was one of the first in the industry to install a complete drop forging plant, and has an extensive collection of dies, designed specially for motor car work. Because of its early entry into this department of manufacture drop forgings are used to a very liberal extent throughout the car, a special grade of nickel steel being made use of. Among the noticeable forgings are: one-piece camshaft, connecting rods, differential housing cover, I-beam front axle, and a vast number of smaller parts.

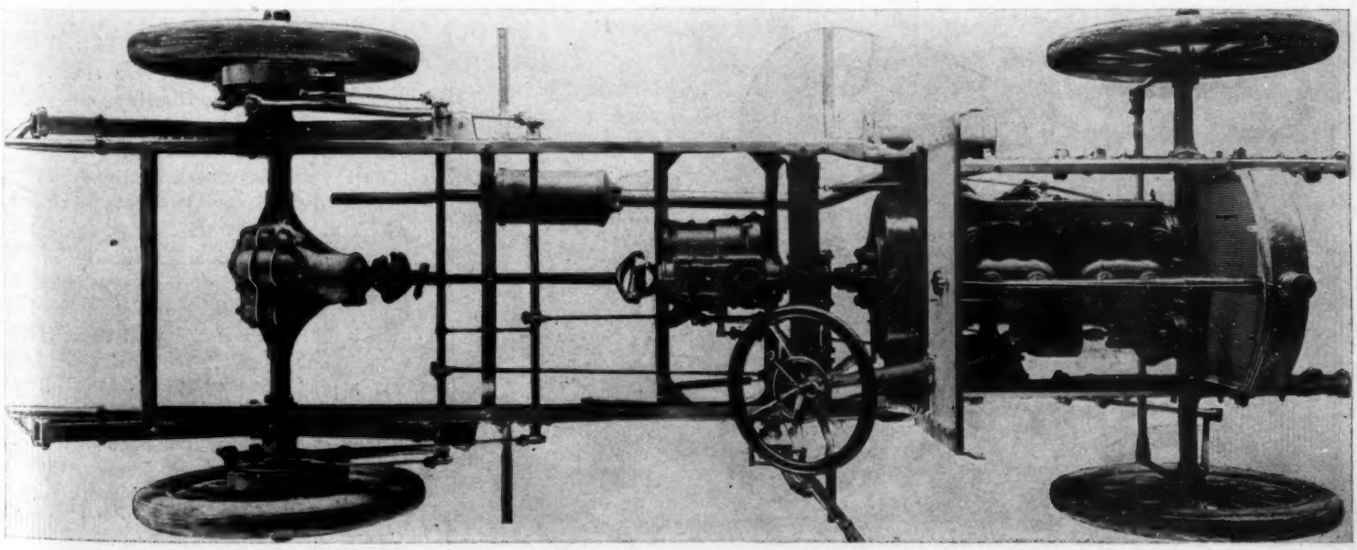
Where the electric car is concerned, there is naturally not a great deal of change to be noted, though both the running of the car and its mileage, as well as its service generally, have been greatly improved by the adoption of the Hess-Bright ball-bearings in the running gear. Two cells have been added to the battery, bringing its voltage at the terminals up to 72, and a few other minor changes have been made, though so far as its external appearance goes, the car is the same as the many thousands of others of its kind that the company has turned out in the past, and which are now in use all over the country.

## TRANSPORTATION SCHEME

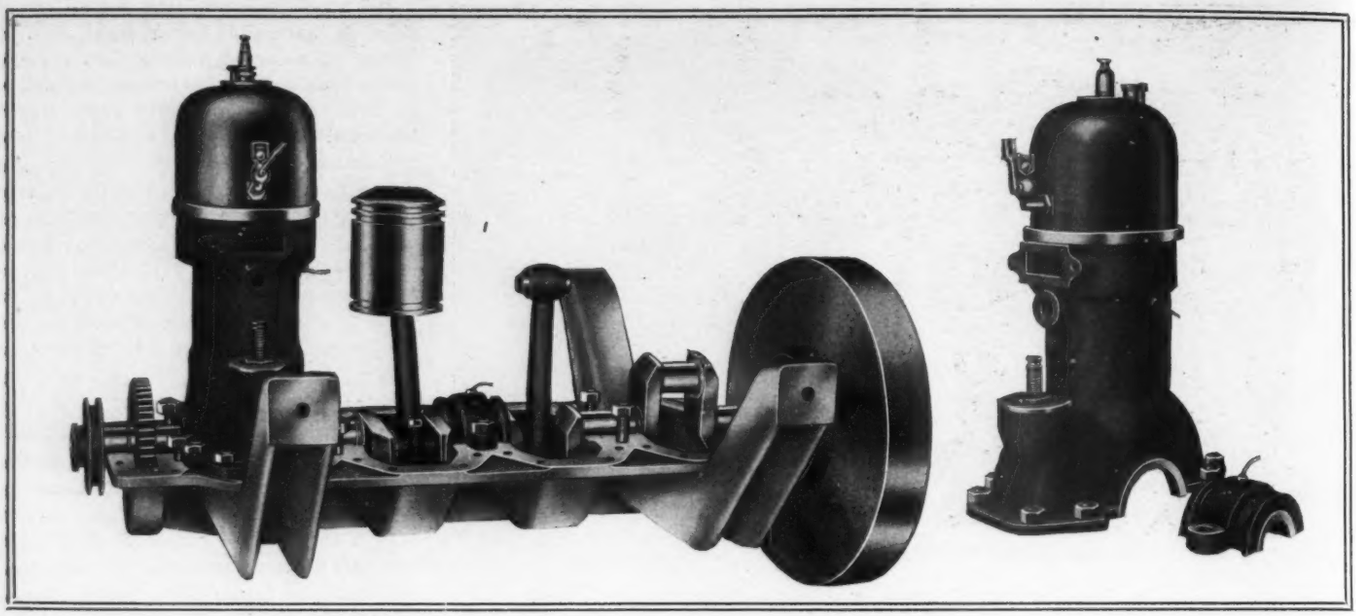
Motor cars to be shipped from one end of France to the other need no longer be mounted on an open truck and covered with a tarpaulin if the Paris-Lyons-Mediterranée railroad is used. This company has just had constructed eighty covered wagons specially designed for the transportation of motor cars. Entrance is at each end by full hinged doors opening outwards, sliding side doors being also provided for the entrance of persons only. The interior of each wagon is so fitted that the largest or the smallest car can be secured in a few minutes without any possibility of it working loose under the greatest shocks and without any danger of the paintwork being scratched. Movable bars with suitably shaped blocks attached to



COLUMBIA GEARBOX



COLUMBIA CHASSIS WITH SHAFT DRIVE AND MAKE-AND-BREAK IGNITION



MOTOR CONSTRUCTION IN BAILEY FOUR-CYLINDER TWO-CYCLE MOTOR

them fit in grooves ready to be brought to the front and rear of each axle and there secured by stout pins. Heavy leather straps give further security, and rolling is prevented by other attachments.

## BAILEY TWO-CYCLE CAR

Another addition to the growing ranks of the two-cycle exponents is the Bailey, manufactured by the Bailey Automobile Co., Springfield, Mass. It is only after 5 years' experience with two-cycle engines that the Bailey company has finally placed a car upon the market. It claims to have made radical improvements on all other two-cycle engines in use in cars, and also to have the most powerful two-cycle four-cylinder car in the field. The Bailey is built in two models, one a three-seated speedster and the other a touring regular car.

Simplicity and sturdiness are the features of the powerplant. The cylinders are cast separately, each with the upper part of its respective division of the crankcase integral. The lower half of the case forms the support of the whole motor, and has arms extending to the frame. Five long bearings of high-pressure metal carry the crankshaft and retain the pressure in the crankcase. The shaft itself is made of vanadium steel with hardened and ground journals.

After a careful study of the problems involved, the Bailey company adopted the automatic valve inlet. It admits a fresh charge to the crankcase during the entire aspiration stroke. The automatic valve may be seen on the base of the cylinder in the illustration; the intake manifold is clamped down over the valve. The cylinders are copper-jacketed, making a uniform jacket which can be replaced in case of accident at a very low cost. The change-gear used is the three-speed selective sliding gear type with Timken roller bearings, connected to the engine by a multiple-disk clutch. Timken roller-bearing axles are also used; the front axle an I-beam, the rear of the floating type, with bevel drive. The springs are long and the frame is a 4-inch pressed steel channel, hung low. The wheelbase is 112 inches.

FIG. 1—ASSEMBLY OF UNTERBERG AND HELMLE'S MAGNETO

## U. AND H. MAGNETOS

The U. and H.—Unterberg & Helmle—magneto differs from many iginition devices of its type in that it is self-starting to the extent that the intensity of the starting spark is at a maximum, whether the starting crank is turned slowly or fast. Four illustrations serve to illustrate the construction of this magneto. In Fig. 4, showing the driving end with the cover plate remover, the steel driving disk A is slipped from the end of the armature shaft C. In Fig. 2 appears the inside face of the disk A, where also is shown the cover plate L and a bronze disk D which is attached to the armature shaft. This disk B carries a coil spring, one end of which attaches to the disk and the other end E forms a loop for engaging the pin D on the disk A, shown in Fig. 4. Formed on the disk B are two cam surfaces F which are held by the spring against two related cam-shaped stops G, Fig. 2. The rotation shown is counter clockwise, and the spring compels the disk B and the armature to follow the disk A as if they were in one piece. A steel ball loose in the slot I projects behind the disk B and striking the fixed steel cam J is pressed forward against the flat face of the disk A. As the cam J is stationary, the disk B cannot turn further, although disk A continues turning, rubbing as it does against the ball and winding up the spring E until the radial depression in the back

of disk A comes opposite the ball. The ball slips into the depression, thereby escaping the cam J and the disk B flies around under the tension of the spring until the cam F and the stops G engage. As soon as the motor attains a speed of 60 revolutions per minute, thte ball is held by centrifugal force in the other portion of the slot I and so does not engage the cam J. This arrangement not only turns the armature swiftly past the firing position, but retards it to a definite point which is dependent on the advance of the interrupter by the spark lever.

In Figs. 1 and 3 are shown the interrupter and distributer, in which N is the ground connections to the switch, P the ring carrying the interrupting cams, Q the barrel of the interrupter, S the platinum points, and T the fiber spool. The interrupter is located and driven by a crosswise key in the back plate against which it screws. The condenser V is set in the back of the housing Q and held there by the threaded plate U. The molded insulation W for the distributer has the contacts 1, 2, 3 and 4 imbedded in it against which contacts bears the carbon brush Y. The safety spark gap consists of a metal point connected to the carbon brush Y from which the spark jumps to the point Z in casing X. Mica windows in the casing permit of seeing the spark without the risk of igniting the gasoline vapor. In Fig. 4 appears the timing pin N by means of which the armature is located in its proper position for firing, which is done with the spark lever fully advanced.

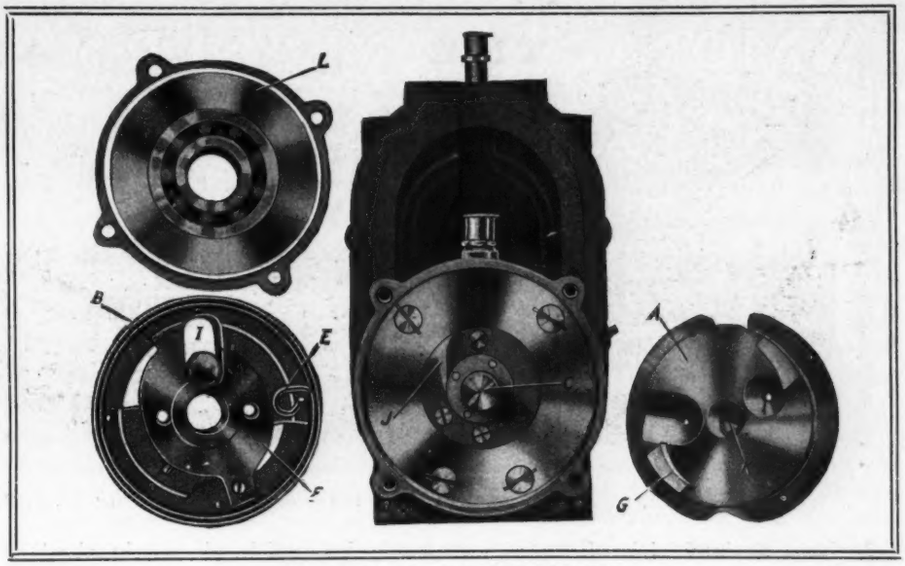



FIG. 2—PARTS OF U. & H. MAGNETO

## BURNS MOTOR BUGGY

Burns Bros., Havre de Grace, Md., manufacture a transformable coupe car of the semi-motor buggy type, in that the front and rear wheels are 40 and 42 inches in diameter respectively, and are shod with solid or cushion tires. The transformable coupe body consists of a single seat for two, with glass sides and back and permanent top which projects in the form of a canopy to the vertical plane of the dash. For winter weather a glass front and side doors are provided, making an entirely enclosed and inside-operated coupe. The power plant is a 12-horsepower, two-cylinder opposed air-cooled motor which transmits through a friction gearset to a jackshaft; the drive from this jackshaft is by enclosed side chains through large rear wheel sprockets. The friction gear shafts are carried throughout on ball bearings. Timken axles are employed in front and rear, each being of square cross section 1¼ inch to the side. Front and rear springs are full ellipties, wheel steering is employed, with spark and throttle control above it and the other control is through side lever. The frame is a wood construction reënforced with 1½-inch angle iron. A neat under pan or mud apron is furnished, front and rear fenders are united by a continuous running board construction and a goodly sized forward bonnet is used. The dash is a straight wood effect, heavily tufted leather upholstering is employed and for winter use the coupe doors have a 24-inch clearance with outside and inside handles. For regular summer use the glass front can be swung upwards in its frame and fastened inside the top projection by hinges. The body is made with well-braced sills and posts. All of the speeds are controlled with the one side lever. The use of road wheels of medium diameter goes far in counteracting the buggy effect of the car, which is further assisted by the long wheelbase and body design employed.

## SALON SHOW PREPARATIONS

Permission has already been obtained from the prefect of police of the Paris district to allow gas engines to be run in the grand palace during the second salon, to be held next December, for commercial cars only. It was feared that permission would not be granted for this in the grand palace, a structure dedicated to fine arts, and one of the most valuable buildings in the city. Special precautions will be taken, however, against the outbreak of fire, with the result that machinery in motion will again be one of the features of the industrial section. The total number of exhibitors at the Paris salon is 696, and the maximum space allowed each firm is 53 square feet. In the industrial section America will be represented by all the leading machine tool makers; in the pleasure car show the firms having secured space are Ford, Buick, Rushmore, B. F. Goodrich Co. and Vacuum Oil Co.

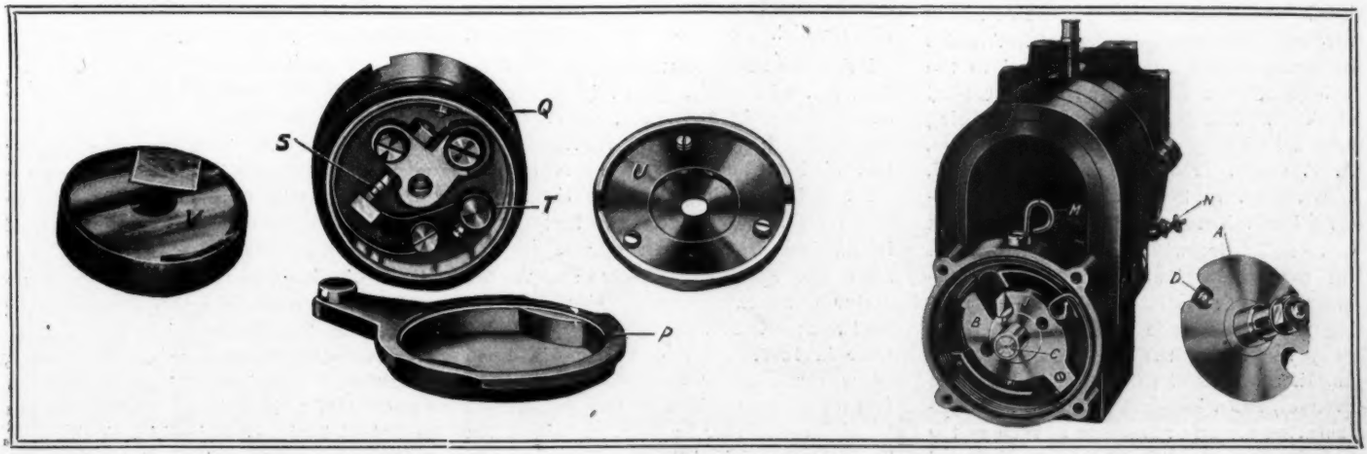



FIG. 3 CONSTRUCTION AND ASSEMBLING OF THE U. & H. MAGNETO FIG. 4

# AMONG THE MAKERS AND DEALERS

PRESENT APPEARANCE OF PLANT OF KNOX AUTOMOBILE CO. AT SPRINGFIELD, MASS.

**Dividend Declared**—John J. Townsend, referee in bankruptcy, has declared a first dividend of 15 per cent out of the estate of Leon Rubay of New York.

**Handling Michelins**—H. D. Benner has secured the Philadelphia agency for Michelin tires, and has opened well-appointed quarters at 320 North Broad street, to take care of the rapidly growing business in those tires which has developed in the Quaker City.

**Studebaker Motor Buggies**—The Studebaker Automobile Co. is reported to be bringing out a new motor buggy and four-passenger surrey. This car has solid tires, shaft drive, magneto, wheel steering, force feed oiler and air-cooled motor. Both the surries and the buggies will be equipped with top, storm front and storm curtains.

**Change of Name**—The H. T. Hearsey Vehicle Co., Indianapolis, recently changed its name to the Hearsey-Willis Co., following the purchasing of an interest in the company by Fred I. Willis. Arrangements have been completed by the company to continue the state agencies for the White steamer and Rambler and in addition the company will take on the Indiana agency for the Mitchell, at present held by the Fisher Auto Co.

**Will Make Electrics**—A new company has been formed for the purpose of manufacturing electrics in Toledo, O. Articles of incorporation have been issued to the Toledo Electric Vehicle Co., with a capital stock of $50,000, the following being named as incorporators: Willard E. Allen, A. F. Clark, Frederick B. Willard, E. J. Hall and J. W. Schaufelberger. The concern has taken over the Allen & Clark Co., of Toledo, which was organized for the purpose originally of developing the ideas of A. F. Clark, who was experimenting with an electric machine. The company has leased the old riding academy building at Collingwood and Delaware avenues, and will begin the work of manufacturing electric runabouts as soon as the building can be suitably remodelled and overhauled, which will be in aboutt a month. Willard E. Allen, who is also president of the Allen Mfg. Co., will head the new concern.

**Stepney's New York Branch**—The Spare Motor Wheel of America recently opened a large showroom at 1773 Broadway, New York city, which will be eastern headquarters for the Stepney spare wheel.

**Burwell Made Superintendent**—George Burwell, of Lansing, Mich., has been appointed superintendent of the Oscar Lear Automobile Co., at Springfield, O., filling the vacancy caused by the resignation of William J. Miller. Burwell has been connected with the Olds company.

**C. F. Kimball Convalescent**—C. F. Kimball, of C. P. Kimball & Co., of Chicago, body builders, has about recovered from his recent illness and now is on his way home from Europe, where he had visited the leading factories and had made a tour of Italy. While in Paris he was stricken with an attack of acute indigestion, which for a time threatened to be serious.

**Lear Has Small Fire**—The warehouse of the Oscar Lear Automobile Co. at Springfield, Ohio, was destroyed by fire September 24, involving a loss estimated at $5,000. Several old cars were consumed, but fortunately there were no new ones in the main building at the time. Sparks from a locomotive started the blaze which threatened the entire plant.

**Baltimore Tradesman Dies**—Martin Gillet Gill, Sr., who was engaged in the motor car business, in Baltimore, with his son, Howard Gill, president of the Motor Car Co., died at his home of heart trouble. He had been ailing for some time. Mr. Gill built and conducted the first garage in Baltimore. This garage was on the same site upon which now stands the Motor Car Co., Mount Royal and Maryland avenues. Mr. Gill was born in Baltimore in 1839. At the time of his death he was a member of the tea importing firm of Martin Gillet & Co., established by his grandfather in 1811, the oldest tea house in the United States. After becoming a member of the firm in 1862, he was sent to Japan and China as an expert tea taster, and resided there several years in that capacity.

**Receiver Discharged**—The Chicago branch of the Royal Tourist received word Wednesday that the company now is out of the receiver's hands and that there has been a reorganization.

**New Publicity Men**—Fred J. Wagner and Russell A. Field have established an advertising service in the Thoroughfare building, 1777 Broadway, New York city, under the name of Wagner-Field Co. The motor car and interests allied with its sale and manufacture will be made a specialty.

**New Colors for Franklins**—For the past 3 years the Franklin company has confined the finish of its motor cars to one color, this being royal blue. Popular demand for the combination color finished motor car, however, has induced the company to finish its runabouts for the coming season of 1909 with red body and black running gear.

**No Kissel Changes**—Beyond a formal reorganization of the company as necessary under incorporation laws of Wisconsin, there will be no change in the Kissel Motor Car Co., of Hartford, Wis., following the death of Louis Kissel, president. The Kissel factory is running with a full head of steam to keep up with the intended output for 1909. All parts are now made at Hartford, including wind shields and bodies.

**Smith Quits the Rambler**—The surprise of the week in Philadelphia was the announcement that William F. Smith had resigned from the management of the local Rambler branch and had at once signed up as district sales manager of the Maxwell-Briscoe company, with a distributing branch in the Quaker city and a territory including Pennsylvania, south Jersey, Delaware, Virginia, West Virginia, eastern Ohio, Maryland, North Carolina and the District of Columbia. William C. Longstreth will have immediate charge of

the Philadelphia quarters, the location of which has not yet been announced. Smith had been connected with the Rambler interests for 13 years.

**Branch in Chicago**—The Universal Auto Spring Co. has opened a salesroom at 1501 Michigan avenue, Chicago, where it will demonstrate the Universal springs.

**Another for Foss & Hughes**—The latest addition to the already large line represented by Foss & Hughes, Philadelphia agents for the Pierce-Arrow, Knox, Cadillac and Baker electric, is the E.-M.-F. They have agreed to dispose of 200 of these cars in the Quaker City and shipments will begin at once.

**Fire at Fond du Lac**—Fire said to have originated in the Crescent garage at Fond du Lac, Wis., destroyed property worth $250,000 on Friday night, September 25. The garage was totally destroyed, with seven cars, including the new model I Locomobile of Lieutenant-Governor William D. Connor, who put it up for the night on his way home from Milwaukee to Marshfield.

**Haynes Increases Capital**—It is understood that the capital stock of the Haynes Automobile Co., of Kokomo, Ind., is to be increased $180,000 in order to extend the business. Of this amount, it is understood, about $130,000 will be taken in Kokomo and the balance will be subscribed by Portland capitalists. It is stated that the plant is to be pushed to its full capacity and that 500 men will soon be at work.

**Franklin at State Fair**—For the first time in the history of New York state fair there was this year an exhibit of motor cars, the H. H. Franklin Mfg. Co. having taken a large space in the new $220,000 manufacturers' and liberal arts building. The state fair authorities have for some time past endeavored to induce the motor car makers to take part in the New York state exhibition, but until this year the facilities for the safe and proper exhibition of cars have not been such as warranted the makers doing so. The Franklin company, therefore, has the distinction of being the first motor car concern to exhibit at the state fair.

**Will Tune Up Cars Free**—Oldsmobiles, which for the past few years have been represented in Philadelphia by the Motor Shop, at 317-319 North Broad street, beginning October 1 are being handled through the medium of a branch house, with William Taylor, formerly factory representative of the Oldsmobile, in the Philadelphia territory, as manager. Quarters have been secured in the large new building at 231-233 North Broad street. Manager Taylor has announced that the local branch will take care of purchasers' cars free for 1 year, keeping the machines in first-class condition by providing the services of experienced mechanics and repair men to make adjustments and otherwise keep the cars "tuned up." Agencies will at once be opened up in all the large towns in the territory under Mr. Taylor's jurisdiction, including several sub-branches.

**Tradesman Elopes**—A romantic wedding of interest to the motor world was the elopement from Racine, Wis., of Miss Ada Bate, daughter of John W. Bate, designer for the Mitchell Motor Car Co., and Otis C. Friend, junior member of the Browne-Friend Motor Co., Milwaukee agent for the Mitchell. Mr. Friend first met Miss Bate during the annual convention of Mitchel agents in Racine about a month ago. They were married in Chicago and telegraphed for the parental blessing and forgiveness, which was readily granted.

**Discusses Garden Show**—The show committee of the licensed association met in New York last week. Arthur N. Jervis was again appointed press agent of the Garden show. The headquarters of the committee will be the Hotel Breslin. The committee took up the matter of electrical effects for both illumination and decorative purposes, with the idea of introducing novel features. Allotment of space to exhibitors in the commercial vehicle section was made. Owing to the demand for space by exhibitors of electrics, it was necessary to postpone allotment of space in this division in order to arrange for the necessary room if possible.

**Will Make Cars**—The C. P. & L. Lauson Co., manufacturer of gas and gasoline engines in Milwaukee, has changed its name to the Christensen Engineering Co. and increased its capital stock from $75,000 to $150,000. The manufacture of motor cars will hereafter be its principal line of activity. The plant at 841-847 Thirtieth street will be greatly enlarged. N. A. Christensen is president; R. L. Gruber, vice-president, and A. H. Lauson, secretary and treasurer. Mr. Christensen is the inventor of the Christensen air brake and an automatic air compressor now widely used by motor car manufacturers and garages. Up to 1905 he was president of the National Electric Co. The old company now operates as the National Brake and Electric Co. Mr. Christensen retired and joined the Lauson interests.

**Buick's Cleveland Branch**—The Cleveland branch of the Buick, will be located at 1615 Euclid avenue, where will be located Ray M. Colwell, who has been traveling the state of Ohio for the Buick.

**Pope's August Report**—The monthly statement for August filed by the receivers of the Pope Motor Car Co., in the United States court at Toledo, shows that 250 men were employed during the month on a payroll of $8,673.25. The cash balance was increased from $192,098.60 to $214,250.18 during the month.

**Rambler Prize Winners**—Two hundred and seventeen Rambler dealers were entered in a recent contest to discover the ten best reasons why it is most advantageous for a dealer to sell Ramblers. Ten men, each one of whom has been identified with the company for many years, acted as judges and read every letter. J. F. St. Clair, Concordia, Kan., won the first prize of $50. Miss Ella J. Brown, secretary Coit Automobile Co., Omaha, Neb., won $25; L. G. Martin, Pittsburg, Pa., drew third prize, and I. R. Campbell, Des Moines, Iowa, drew fourth prize.

**New York Trade Addition**—A new company, known as the Pope-Hartford Auto Co., will have charge of the Pope-Hartford business in New York and vicinity. The new company has for its president, H. E. Holt. The treasurer is B. E. Fincke, of Newark, N. J. C. A. Dickson is secretary. Quarters for the company have been opened at 1853 Broadway, in the store formerly occupied by the Wayne company. The Pope-Hartford models for the season of 1909 include the S touring car, which is a 30-horsepower, following to a considerable extent the lines which have been pursued in the manufacture of Pope-Hartfords for the last few years. A variation of the same car is the standard roadster with two rear bucket seats, and a pony tonneau car on the same chassis.

EXHIBIT OF THE FRANKLIN COMPANY AT NEW YORK STATE FAIR

# Legal Lights and Side Lights

## FIGHTING WHEEL TAX

Chicago's fight against the imposition of a wheel tax will be carried to the state supreme court and will be taken up in December when the appeal made by the Chicago Motor Club and the Chicago Automobile Trade Association will be heard. Preliminary guns were fired last week when William H. Arthur, attorney for the two organizations, sought an injunction against the city before Judge Honore. The city filed a demurrer which was sustained by Judge Honore, who, however, listened to the arguments of Attorney Arthur, then gave him the right to appeal directly to the supreme court. Attorney Arthur is making his fight on two points, either of which he believes is good enough to enable the motorists to have the ordinance declared invalid. The first is that discrimination is shown in the tax imposed in that there is no provision made for taxing the owner of a car that carries but one person, whereas for a two-passenger runabout $12 is charged, while for rigs carrying three or more the fee is $20. In comparison with this, a one-horse rig pays but $5. The second point is that the state motor vehicle law was passed for the purpose of taking away from cities, towns and villages, the control of motor cars not used for public hire which, Arthur claims, makes the city ordinance conflict with the state law. To the motorists this last point seems very well taken and it is believed the supreme court cannot help but see it that way. It is in section 13 that Arthur finds his most comfort, that clause reading:

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of disk A comes opposite the ball. The ball slips into the depression, thereby escaping the cam J and the disk B flies around under the tension of the spring until the cam F and the stops G engage. As soon as the motor attains a speed of 60 revolutions per minute, thte ball is held by centrifugal force in the other portion of the slot I and so does not engage the cam J. This arrangement not only turns the armature swiftly past the firing position, but retards it to a definite point which is dependent on the advance of the interrupter by the spark lever.

In Figs. 1 and 3 are shown the interrupter and distributer, in which N is the ground connections to the switch, P the ring carrying the interrupting cams, Q the barrel of the interrupter, S the platinum points, and T the fiber spool. The interrupter is located and driven by a crosswise key in the back plate against which it screws. The condenser V is set in the back of the housing Q and held there by the threaded plate U. The molded insulation W for the distributer has the contacts 1, 2, 3 and 4 imbedded in it against which contacts bears the carbon brush Y. The safety spark gap consists of a metal point connected to the carbon brush Y from which the spark jumps to the point Z in casing X. Mica windows in the casing permit of seeing the spark without the risk of igniting the gasoline vapor. In Fig. 4 appears the timing pin N by means of which the armature is located in its proper position for firing, which is done with the spark lever fully advanced.

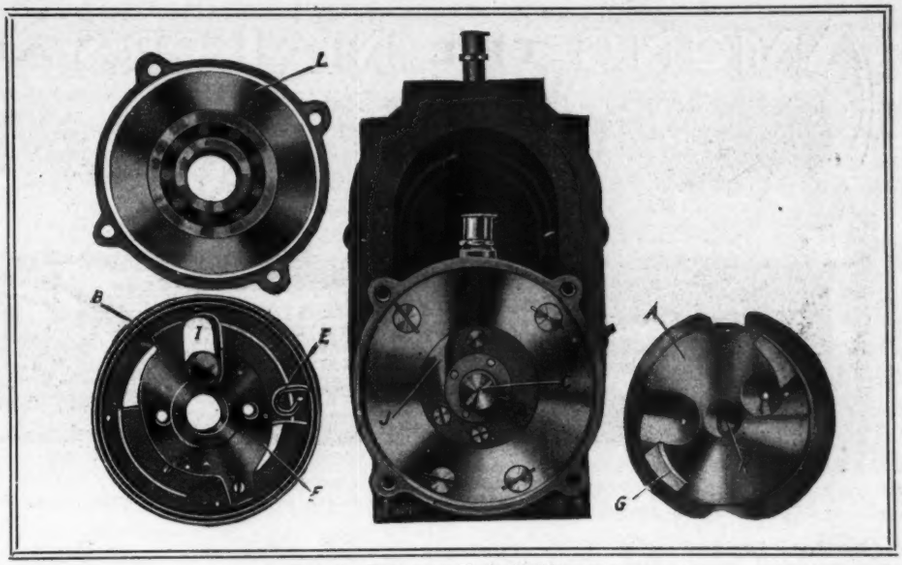



FIG. 2—PARTS OF U. & H. MAGNETO

## BURNS MOTOR BUGGY

Burns Bros., Havre de Grace, Md., manufacture a transformable coupe car of the semi-motor buggy type, in that the front and rear wheels are 40 and 42 inches in diameter respectively, and are shod with solid or cushion tires. The transformable coupe body consists of a single seat for two, with glass sides and back and permanent top which projects in the form of a canopy to the vertical plane of the dash. For winter weather a glass front and side doors are provided, making an entirely enclosed and inside-operated coupe. The power plant is a 12-horsepower, two-cylinder opposed air-cooled motor which transmits through a friction gearset to a jackshaft; the drive from this jackshaft is by enclosed side chains through large rear wheel sprockets. The friction gear shafts are carried throughout on ball bearings. Timken axles are employed in front and rear, each being of square cross section 1¼ inch to the side. Front and rear springs are full ellipties, wheel steering is employed, with spark and throttle control above it and the other control is through side lever. The frame is a wood construction reënforced with 1½-inch angle iron. A neat under pan or mud apron is furnished, front and rear fenders are united by a continuous running board construction and a goodly sized forward bonnet is used. The dash is a straight wood effect, heavily tufted leather upholstering is employed and for winter use the coupe doors have a 24-inch clearance with outside and inside handles. For regular summer use the glass front can be swung upwards in its frame and fastened inside the top projection by hinges. The body is made with well-braced sills and posts. All of the speeds are controlled with the one side lever. The use of road wheels of medium diameter goes far in counteracting the buggy effect of the car, which is further assisted by the long wheelbase and body design employed.

## SALON SHOW PREPARATIONS

Permission has already been obtained from the prefect of police of the Paris district to allow gas engines to be run in the grand palace during the second salon, to be held next December, for commercial cars only. It was feared that permission would not be granted for this in the grand palace, a structure dedicated to fine arts, and one of the most valuable buildings in the city. Special precautions will be taken, however, against the outbreak of fire, with the result that machinery in motion will again be one of the features of the industrial section. The total number of exhibitors at the Paris salon is 696, and the maximum space allowed each firm is 53 square feet. In the industrial section America will be represented by all the leading machine tool makers; in the pleasure car show the firms having secured space are Ford, Buick, Rushmore, B. F. Goodrich Co. and Vacuum Oil Co.

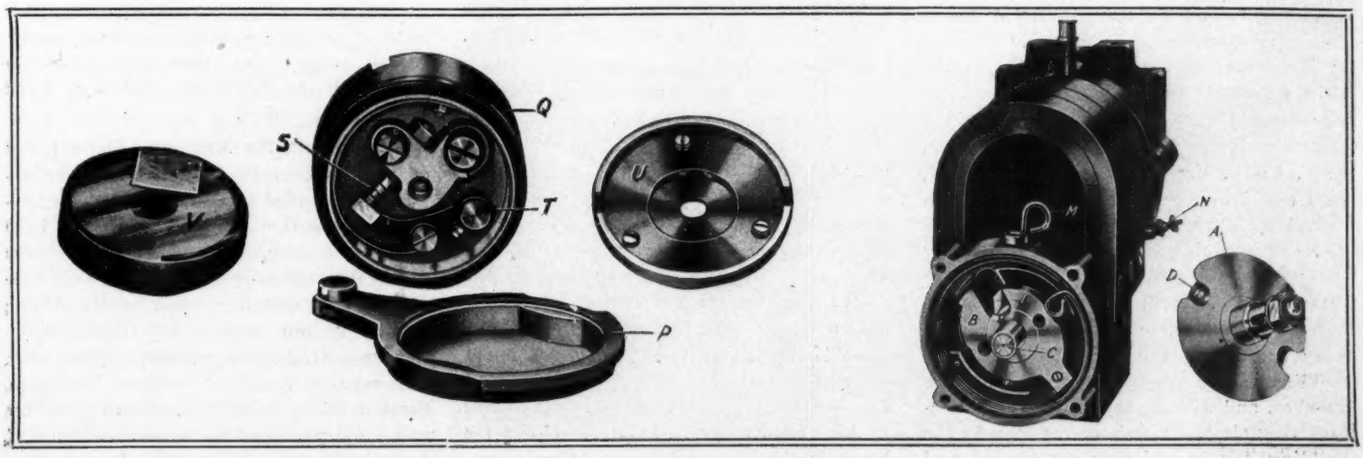
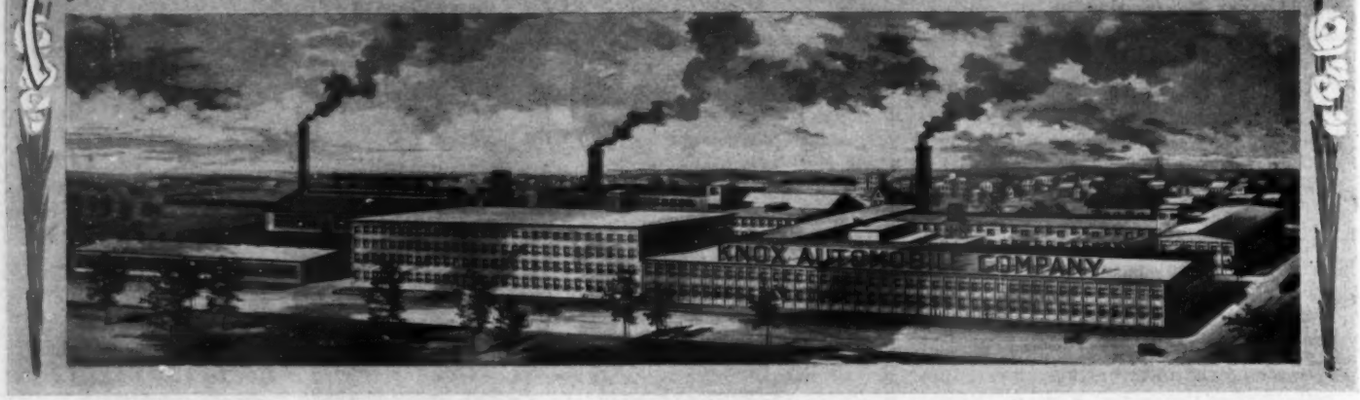



FIG. 3 CONSTRUCTION AND ASSEMBLING OF THE U. & H. MAGNETO FIG. 4

# AMONG THE MAKERS AND DEALERS




PRESENT APPEARANCE OF PLANT OF KNOX AUTOMOBILE CO. AT SPRINGFIELD, MASS.

**Dividend Declared**—John J. Townsend, referee in bankruptcy, has declared a first dividend of 15 per cent out of the estate of Leon Rubay of New York.

**Handling Michelins**—H. D. Benner has secured the Philadelphia agency for Michelin tires, and has opened well-appointed quarters at 320 North Broad street, to take care of the rapidly growing business in those tires which has developed in the Quaker City.

**Studebaker Motor Buggies**—The Studebaker Automobile Co. is reported to be bringing out a new motor buggy and four-passenger surrey. This car has solid tires, shaft drive, magneto, wheel steering, force feed oiler and air-cooled motor. Both the surries and the buggies will be equipped with top, storm front and storm curtains.

**Change of Name**—The H. T. Hearsey Vehicle Co., Indianapolis, recently changed its name to the Hearsey-Willis Co., following the purchasing of an interest in the company by Fred I. Willis. Arrangements have been completed by the company to continue the state agencies for the White steamer and Rambler and in addition the company will take on the Indiana agency for the Mitchell, at present held by the Fisher Auto Co.

**Will Make Electrics**—A new company has been formed for the purpose of manufacturing electrics in Toledo, O. Articles of incorporation have been issued to the Toledo Electric Vehicle Co., with a capital stock of $50,000, the following being named as incorporators: Willard E. Allen, A. F. Clark, Frederick B. Willard, E. J. Hall and J. W. Schaufelberger. The concern has taken over the Allen & Clark Co., of Toledo, which was organized for the purpose originally of developing the ideas of A. F. Clark, who was experimenting with an electric machine. The company has leased the old riding academy building at Collingwood and Delaware avenues, and will begin the work of manufacturing electric runabouts as soon as the building can be suitably remodelled and overhauled, which will be in aboutt a month. Willard E. Allen, who is also president of the Allen Mfg. Co., will head the new concern.

**Stepney's New York Branch**—The Spare Motor Wheel of America recently opened a large showroom at 1773 Broadway, New York city, which will be eastern headquarters for the Stepney spare wheel.

**Burwell Made Superintendent**—George Burwell, of Lansing, Mich., has been appointed superintendent of the Oscar Lear Automobile Co., at Springfield, O., filling the vacancy caused by the resignation of William J. Miller. Burwell has been connected with the Olds company.

**C. F. Kimball Convalescent**—C. F. Kimball, of C. P. Kimball & Co., of Chicago, body builders, has about recovered from his recent illness and now is on his way home from Europe, where he had visited the leading factories and had made a tour of Italy. While in Paris he was stricken with an attack of acute indigestion, which for a time threatened to be serious.

**Lear Has Small Fire**—The warehouse of the Oscar Lear Automobile Co. at Springfield, Ohio, was destroyed by fire September 24, involving a loss estimated at $5,000. Several old cars were consumed, but fortunately there were no new ones in the main building at the time. Sparks from a locomotive started the blaze which threatened the entire plant.

**Baltimore Tradesman Dies**—Martin Gillet Gill, Sr., who was engaged in the motor car business, in Baltimore, with his son, Howard Gill, president of the Motor Car Co., died at his home of heart trouble. He had been ailing for some time. Mr. Gill built and conducted the first garage in Baltimore. This garage was on the same site upon which now stands the Motor Car Co., Mount Royal and Maryland avenues. Mr. Gill was born in Baltimore in 1839. At the time of his death he was a member of the tea importing firm of Martin Gillet & Co., established by his grandfather in 1811, the oldest tea house in the United States. After becoming a member of the firm in 1862, he was sent to Japan and China as an expert tea taster, and resided there several years in that capacity.

**Receiver Discharged**—The Chicago branch of the Royal Tourist received word Wednesday that the company now is out of the receiver's hands and that there has been a reorganization.

**New Publicity Men**—Fred J. Wagner and Russell A. Field have established an advertising service in the Thoroughfare building, 1777 Broadway, New York city, under the name of Wagner-Field Co. The motor car and interests allied with its sale and manufacture will be made a specialty.

**New Colors for Franklins**—For the past 3 years the Franklin company has confined the finish of its motor cars to one color, this being royal blue. Popular demand for the combination color finished motor car, however, has induced the company to finish its runabouts for the coming season of 1909 with red body and black running gear.

**No Kissel Changes**—Beyond a formal reorganization of the company as necessary under incorporation laws of Wisconsin, there will be no change in the Kissel Motor Car Co., of Hartford, Wis., following the death of Louis Kissel, president. The Kissel factory is running with a full head of steam to keep up with the intended output for 1909. All parts are now made at Hartford, including wind shields and bodies.

**Smith Quits the Rambler**—The surprise of the week in Philadelphia was the announcement that William F. Smith had resigned from the management of the local Rambler branch and had at once signed up as district sales manager of the Maxwell-Briscoe company, with a distributing branch in the Quaker city and a territory including Pennsylvania, south Jersey, Delaware, Virginia, West Virginia, eastern Ohio, Maryland, North Carolina and the District of Columbia. William C. Longstreth will have immediate charge of

the Philadelphia quarters, the location of which has not yet been announced. Smith had been connected with the Rambler interests for 13 years.

**Branch in Chicago**—The Universal Auto Spring Co. has opened a salesroom at 1501 Michigan avenue, Chicago, where it will demonstrate the Universal springs.

**Another for Foss & Hughes**—The latest addition to the already large line represented by Foss & Hughes, Philadelphia agents for the Pierce-Arrow, Knox, Cadillac and Baker electric, is the E.-M.-F. They have agreed to dispose of 200 of these cars in the Quaker City and shipments will begin at once.

**Fire at Fond du Lac**—Fire said to have originated in the Crescent garage at Fond du Lac, Wis., destroyed property worth $250,000 on Friday night, September 25. The garage was totally destroyed, with seven cars, including the new model I Locomobile of Lieutenant-Governor William D. Connor, who put it up for the night on his way home from Milwaukee to Marshfield.

**Haynes Increases Capital**—It is understood that the capital stock of the Haynes Automobile Co., of Kokomo, Ind., is to be increased $180,000 in order to extend the business. Of this amount, it is understood, about $130,000 will be taken in Kokomo and the balance will be subscribed by Portland capitalists. It is stated that the plant is to be pushed to its full capacity and that 500 men will soon be at work.

**Franklin at State Fair**—For the first time in the history of New York state fair there was this year an exhibit of motor cars, the H. H. Franklin Mfg. Co. having taken a large space in the new $220,000 manufacturers' and liberal arts building. The state fair authorities have for some time past endeavored to induce the motor car makers to take part in the New York state exhibition, but until this year the facilities for the safe and proper exhibition of cars have not been such as warranted the makers doing so. The Franklin company, therefore, has the distinction of being the first motor car concern to exhibit at the state fair.

**Will Tune Up Cars Free**—Oldsmobiles, which for the past few years have been represented in Philadelphia by the Motor Shop, at 317-319 North Broad street, beginning October 1 are being handled through the medium of a branch house, with William Taylor, formerly factory representative of the Oldsmobile, in the Philadelphia territory, as manager. Quarters have been secured in the large new building at 231-233 North Broad street. Manager Taylor has announced that the local branch will take care of purchasers' cars free for 1 year, keeping the machines in first-class condition by providing the services of experienced mechanics and repair men to make adjustments and otherwise keep the cars "tuned up." Agencies will at once be opened up in all the large towns in the territory under Mr. Taylor's jurisdiction, including several sub-branches.

**Tradesman Elopes**—A romantic wedding of interest to the motor world was the elopement from Racine, Wis., of Miss Ada Bate, daughter of John W. Bate, designer for the Mitchell Motor Car Co., and Otis C. Friend, junior member of the Browne-Friend Motor Co., Milwaukee agent for the Mitchell. Mr. Friend first met Miss Bate during the annual convention of Mitchel agents in Racine about a month ago. They were married in Chicago and telegraphed for the parental blessing and forgiveness, which was readily granted.

**Discusses Garden Show**—The show committee of the licensed association met in New York last week. Arthur N. Jervis was again appointed press agent of the Garden show. The headquarters of the committee will be the Hotel Breslin. The committee took up the matter of electrical effects for both illumination and decorative purposes, with the idea of introducing novel features. Allotment of space to exhibitors in the commercial vehicle section was made. Owing to the demand for space by exhibitors of electrics, it was necessary to postpone allotment of space in this division in order to arrange for the necessary room if possible.

**Will Make Cars**—The C. P. & L. Lauson Co., manufacturer of gas and gasoline engines in Milwaukee, has changed its name to the Christensen Engineering Co. and increased its capital stock from $75,000 to $150,000. The manufacture of motor cars will hereafter be its principal line of activity. The plant at 841-847 Thirtieth street will be greatly enlarged. N. A. Christensen is president; R. L. Gruber, vice-president, and A. H. Lauson, secretary and treasurer. Mr. Christensen is the inventor of the Christensen air brake and an automatic air compressor now widely used by motor car manufacturers and garages. Up to 1905 he was president of the National Electric Co. The old company now operates as the National Brake and Electric Co. Mr. Christensen retired and joined the Lauson interests.

**Buick's Cleveland Branch**—The Cleveland branch of the Buick, will be located at 1615 Euclid avenue, where will be located Ray M. Colwell, who has been traveling the state of Ohio for the Buick.

**Pope's August Report**—The monthly statement for August filed by the receivers of the Pope Motor Car Co., in the United States court at Toledo, shows that 250 men were employed during the month on a payroll of $8,673.25. The cash balance was increased from $192,098.60 to $214,250.18 during the month.

**Rambler Prize Winners**—Two hundred and seventeen Rambler dealers were entered in a recent contest to discover the ten best reasons why it is most advantageous for a dealer to sell Ramblers. Ten men, each one of whom has been identified with the company for many years, acted as judges and read every letter. J. F. St. Clair, Concordia, Kan., won the first prize of $50. Miss Ella J. Brown, secretary Coit Automobile Co., Omaha, Neb., won $25; L. G. Martin, Pittsburg, Pa., drew third prize, and I. R. Campbell, Des Moines, Iowa, drew fourth prize.

**New York Trade Addition**—A new company, known as the Pope-Hartford Auto Co., will have charge of the Pope-Hartford business in New York and vicinity. The new company has for its president, H. E. Holt. The treasurer is B. E. Fincke, of Newark, N. J. C. A. Dickson is secretary. Quarters for the company have been opened at 1853 Broadway, in the store formerly occupied by the Wayne company. The Pope-Hartford models for the season of 1909 include the S touring car, which is a 30-horsepower, following to a considerable extent the lines which have been pursued in the manufacture of Pope-Hartfords for the last few years. A variation of the same car is the standard roadster with two rear bucket seats, and a pony tonneau car on the same chassis.

EXHIBIT OF THE FRANKLIN COMPANY AT NEW YORK STATE FAIR

# Legal Lights and Side Lights

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# Brief Business Announcements

**Louisville, Ky.**—D. C. McVaw is building a 1-story garage on Fifth street near A.

**Boston, Mass.**—Harry Fosdick has been appointed agent for the Lancia car in the United States.

**Evansville, Ind.**—A new garage is shortly to be erected here by eastern parties. The name of the company has not yet been made public.

**Pittsburg, Pa.**—The Arlington Motor Car Co. has been appointed sole distributor for the Gaeth car in western Pennsylvania.

**Albany, N. Y.**—The Standard Garage Co., of Lockport, has filed a certificate increasing its capital stock from $10,000 to $75,000. A. Edmund Lee acted as attorney for the company.

**Cleveland, O.**—F. C. King, who was formerly connected with the F. B. Stearns Co., has been appointed manager of the repair department of the Metropolitan Motor Car Co.

**Pittsburg, Pa.**—Application will shortly be made for a charter for a new concern to be known as the Mutual Automobile Co., which will manufacture and deal in motor vehicles and supplies and accessories.

**Philadelphia, Pa.**—Application will shortly be made for a charter for a new concern to be known as the S. & G. Motor Car Co., which will manufacture and deal in motors, bicycles and vehicles, as well as supplies and accessories of all kinds.

**Kansas City, Mo.**—Carl J. Simons, who has been acting as manager of the Palace Auto Co., has resigned from that concern, effective on October 1. He will join the forces of the Maxwell-Briscoe branch and will act as manager of the company.

**Beatrice, Neb.**—A meeting of the stockholders of the newly incorporated Jonz Auto Co. was held recently, and a temporary organization was effected. Permanent officers are to be elected later on. Among the incorporators are C. C. Jones, W. W. Scott and J. E. Lang.

**Minneapolis, Minn.**—C. F. Stimson, formerly of Kansas City, has been appointed manager of the new branch which the Maxwell company is about to open here. W. S. Hathaway, the western sales manager, has already closed the contracts for the erection of a new branch house.

**Indianapolis, Ind.**—Indications are that within the next year every carriage manufacturing concern in Indiana will be manufacturing motor buggies. The Seidel Carriage Co., Richmond, and the Anderson Carriage Co., Anderson, have just brought out models of high wheel motor vehicles and it is understood will place them on the market next season. There are now sixteen Indiana companies manufacturing or preparing to manufacture motor buggies.

**Cohoes, N. Y.**—The Campbell & Chute Machine Co. has purchased of Chute Brothers their motor car business.

**Los Angeles, Cal.**—W. H. Halliwell, local agent for the Warner Autometer Co., has removed to offices at 1124 South Main street.

**Springfield, Ill.**—The Levy & Fanning Co., of Chicago, has filed a certificate changing its name to the Levy & Hipple Motor Co.

**Buffalo, N. Y.**—George M. Davis, publicity agent for the E. R. Thomas company, has gone with the George N. Pierce Co. in the same capacity.

**Boston, Mass.**—Capt. R. S. Crawford, formerly president of the Crawford Automobile Co., of Hagerstown, Md., will become the Gyroscope agent here.

**Philadelphia, Pa.**—The Olds Motor Works will open a branch in the 3-story building, 231-233 North Broad street, which will be the distributing center for Pennsylvania, southern New Jersey, Delaware, Maryland and Virginia, and will be in charge of William T. Taylor, who has for many years been factory sales manager for that district.

**Newark, N. J.**—The Atlantic Motor Car Co. has removed to its new building at 228-232 Halsey street. Richard T. Newton, who was formerly with the Motor Car Co. of New Jersey, is to be the manager of the Atlantic company, having left the former concern to take the New York agency for the Stoddard-Dayton, and will divide his time between Newark and New York.

**South Bend, Ind.**—White Garage Co., capital $10,000. Incorporators, Cyrus W. Shafer, Thomas W. Slick, John Shafer and W. A. Slick.

**Frankfort, Ky.**—Miles Auto Co., of Jefferson county, capital $10,000. Incorporators, William H. Curtice, Leon L. Miles and Ada B. Harris.

**Frankfort, Ky.**—Motor Van Co., of Jefferson county, capital $3,000. Incorporators, Dennis L. Miller, J. M. Robinson and Dennis H. Long, of Louisville.

**Corsicana, Tex.**—Corsicana Motor Co., capital stock $6,000. Incorporators, T. P. Kerr, J. Clarence Thomas and S. E. Kerr.

**Newark, N. J.**—United Automobile Dealers' Association, capital $20,000. Incorporators, S. Raymond Clark, William L. Du Hadway, Russell B. Matthews.

**Chicago**—North Shore Garage, 70 La Salle street, capital $5,000, to rent and repair motor cars. Incorporators, John G. Fisher, Alexander K. Jurgenson and Charles G. Nessing.

**New York**—Frawley Taxi Co., capital $100,000, to manufacture, rent, sell and store motor cars. Incorporators, Patrick J. Frawley, of 922 East 167th street; Henry Kellersholm, of 1025 Lexington avenue, and Paul L. Kiernan, of 142 East 40th street.

Frank B. Cleland and E. C. J. McShane are to be the resident managers.

**Upper Montclair, N. J.**—H. & W. Bennett have established a new garage.

**East Orange, N. J.**—Clyde E. Eppstein has purchased the Auto Tire and Supply Co., of 14 Railroad place.

**Indianapolis, Ind.**—The Goshen Motor Works, of Goshen, has been incorporated with a capital stock of $25,000.

**East Orange, N. J.**—Charles E. Reiss will open a sales room of the Overland Motor Car Co., which is also to be the state agency.

**East Orange, N. J.**—W. W. Taxis, who formerly managed the New York office of the White company, has been appointed its manager here.

**Sacramento, Cal.**—A permit has been granted to M. H. Diepenbrock for the erection of a $10,000 garage on J street, between Eleventh and Twelfth.

**Newark, N. J.**—F. W. Briggs has prepared plans for a two-story fireproof garage at 290-292 Belleville avenue. The building will be 50 by 100 feet.

**New York**—Plans have just been filed for a 1-story garage designed by John Ellingsgard at 206-210 West One Hundred and First street, for Montgomery Maze.

**New York**—Charles E. Apgan, who was formerly connected with the Franklin Auto Co., has resigned from that company and in the future will be with the force of the Haynes Automobile Co.

**New York**—S. B. Bowman has leased the northwest corner of Broadway and Forty-ninth street as a salesroom for Clement-Bayard and Apperson cars. The garage, repair department and offices are at 225 West Forty-ninth street.

**Philadelphia, Pa.**—The Penn Motor Car Co., local agent for the Mitchell, has leased the large 3-story building at the northwest corner of Broad and Cherry streets, where it will have show rooms, offices, garage and machine shops. Combined floor space is 30,000 feet.

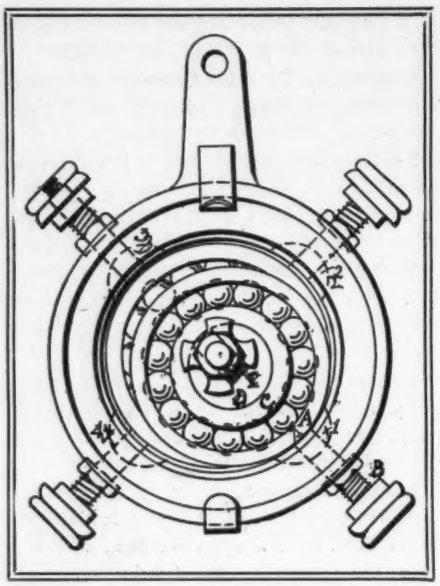
**New London, Conn.**—The W. D. Forbes Co.'s plant on Trumbull street is practically completed and will be occupied this month. The main factory is a 2-story building 50x200 feet. The company manufactures steering wheels, propellers, and motors, and is now located in a plant at Hoboken, N. J.

**Newark, N. Y.**—The annual meeting of the stockholders of the Mora Motor Car Co. was held last week. A resolution was passed reducing the number of the directors from seven to five. S. H. Mora was reëlected president; T. W. Martin, vice president, and W. N. Freeman, secretary and treasurer.

# Development Briefs

## LEHMANN IGNITION SPECIALTIES

The Lehmann Mfg. Co., New York city, manufactures the Lehmann timer and distributer for four and six-cylinder motors. The timer, illustrated, is of the roller type, but instead of a rotating ball forming the revolving contact, as in the LaCoste type, it makes use of an F. & S. type of bearing, the outer race A, shown in the illustration, making contact with the binding posts B. This bearing race has the inner race C carried on a bushing D, in which is a slot E for receiving the squared end of the timer shaft. A nut and lock nut hold this bushing on the required part of the shaft. Should adjustment be needed it is made at this point. It will be seen that the outer race A simply contacts upon the four binding posts in succession, so that wear is not imposed upon any of them. The timer casing is of fiber with the inserted tool steel segments, 1, 2, 3, 4, for the binding posts. The back of the casing is brass, which forms the seating for the ball-bearing in which the driveshaft rotates. A strong spring within the radial slot E keeps the outer race A of the bearing in constant contact with the inner surface of the fiber casing, and so insures contact on the four steel segments 1, 2, 3, 4. In operation the bearing, with its races C and A, follows an eccentric planetary movement, so that one point of the outer race A only is in contact with the outer surface.



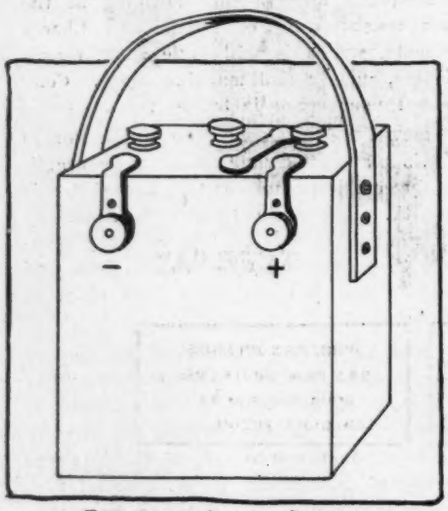
THE LEHMANN TIMER

## AUTOGAS GRADUATED VALVE

The Avery Portable Lighting Co., Milwaukee, Wis., is marketing in connection with its gas tanks a little device which enables the operator to turn on just the right amount of gas to light the lamp. This is accomplished by attaching a disk wheel A over which works an indicator B. All that it is necessary to do is to turn the indicator B the same number of notches on the disk A. In the dark this can be done by counting the number of clicks. A movement of two notches is sufficient for lighting two lamps. The device is a particularly simple affair and can be attached to any make of tank valve.

## SCHUG IGNITION BATTERY

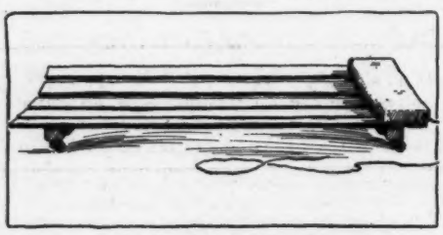
The Schug Electric Co., Detroit, Mich., manufactures in 40, 60 and 80 ampere sizes —all 6 volts—ignition batteries suitable for motor car work. In this battery separate rubber jars are used for each cell, and the cells placed in an oak case with the bottom fastened with maple pins. Lead connectors burned together are used for joining the cells, and the terminals are brought over the side of the box. The top of the battery is sealed with an acid-proof compound. The only metal parts used that are not made of lead are the screws and washers used to fasten the extra heavy rubber handle, or strap, to the box.




THE SCHUG IGNITER BATTERY

## SCHAUB OPPOSED ENGINES

The Schaub & Son Machine Co., Cincinnati, O., manufactures for motor car use a 12-horsepower opposed water-cooled motor with 4 by 4-inch cylinders. The motor is of that conventional type having integral waterjackets and valve chambers, the chambers being on the top of the cylinder heads, so that the valve stems and push-rod are up. The crankshaft, 1¼ inch in diameter, is carried on phosphor bronze bearings and Parsons white metal is used for bushings in the connecting rods. Valves are 1 1/16 inch in diameter, and the two steel camshafts carry hardened steel cams. The crankcase is a box-like compartment with detachable end plate and having the camshaft directly above the crankshaft. On the ends of the cylinders are short integral supporting arms. The length over all from end to end is 29½ inches, and the weight 150 pounds.



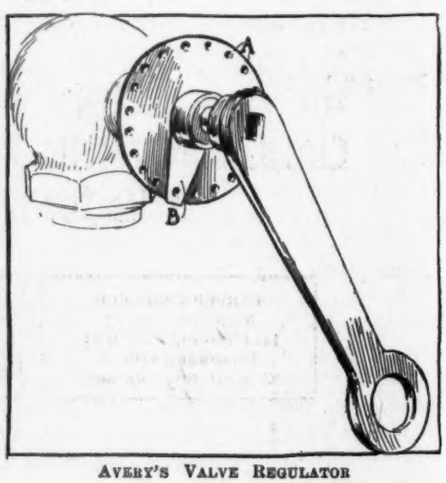
BROWN MOTOR CREEPER

## MOTOR CAR CREEPER

The Brown Co., Syracuse, N. Y., manufactures a particularly useful device for enabling a person to get beneath a motor car without the trouble of crawling on the floor. The device is a simple wooden support, carried on four castors, and with a pillow arrangement at one end. It is of sufficient length to support the trunk of the body, and when resting on it a workman can, with speed and ease, place himself beneath any part of the car. Making the creeper out of slats of woods gives a construction sufficiently light for very convenient handling and yet a creeper strong enough for the greatest needs. The device is valuable in that the user is free from the cold floors.

## SKIDOO SOAP PASTE

The Brown Soap Co., Columbus, Ohio, manufactures Skidoo, a soap paste preparation suited for motorists' use, in that it is specially intended for the removing of stains, grease and grime. The preparation is put up in small cans. In using it, a teaspoonful on the tips of two fingers is sufficient. This is rubbed well into the hands and water added. It can be used for cleaning clothing and different articles.




AVERY'S VALVE REGULATOR